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GAS JOURNAL

LIGHT · HEAT · POWER · BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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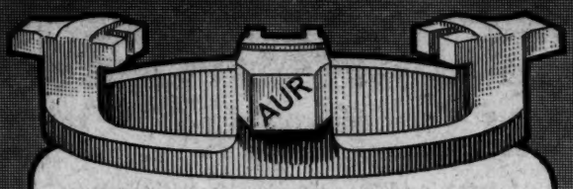

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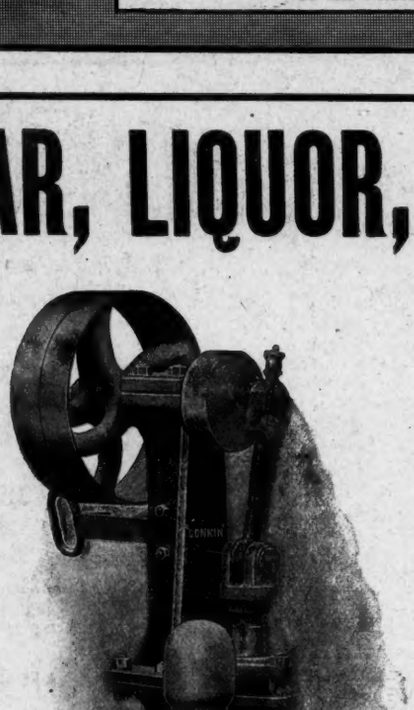

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLV., No. 2905.] TUESDAY, JANUARY 14, 1919. [71ST YEAR.

EDITORIAL NOTES.

The Coal Controller's New Year's Present.

THOUGH there has been general appreciation of the necessity for some of the plans of the Coal Controller—with doubt in various quarters as to certain of them having been of the wisest—throughout Sir Guy Calthrop's difficult reign in the Coal Control Department there has been recognition of the fact that he has been following what he believed to be the most effective courses to achieve the results which were the reason for his existence as the head of a Government wartime department. These results were to make the available coal go round the farthest (while meeting the requirements of the Army and Navy) and keep prices at the lowest possible level consistent with equity. There has been and still is a large disappointment both as to supplies and prices. But in the midst of this, there is good ground for believing that coal control is now beginning to relax. The Department of Publicity at the Coal Controller's Office has been closed-down; and Sir Guy Calthrop found himself in the position to make England and Wales a New Year's present in the shape of a 25 p.ct. concession in the gas and electricity allowances as from the reading of the meter indices at the end of last quarter.

This has been made possible, so the official intimation states, by the reduced gas and electricity requirements of the factories that have been engaged on munitions work. We should think, too, the 100,000 miners who have been released from the Army are beginning to make an impression on coal output; and still more miners are homeward bound from the front. Instead, therefore, of taking this piecemeal course of increasing the gas and electricity allowance by 25 p.ct., the Coal Controller might just as well have cancelled household fuel and lighting rationing outright; for he might have had an easy mind that at the present cost of gas and electricity, for which coal prices and labour are in the main responsible, householders would continue to exercise rigid economy. However, gas consumers will be thankful to have for cooking and heating 18,750 c.ft. of gas as the equivalent of a ton of coal, in lieu of 15,000 c.ft.; but we hope that by the end of the quarter the "All clear" will be heard, and complete liberty be restored to gas consumers, although the Coal Controller at the present time rather fears the coal shortage will continue throughout the winter months. The old allowance of 800 units of electricity as the equivalent of a ton of coal was one of the most grotesque proceedings in coal control. To put 25 p.ct. upon that, and make the equivalent per ton of coal 1000 units is simply reducing control and rationing to burlesque. It is no use Sir Guy talking about coal shortage when he indulges in freaks of this kind.

On the other hand, we are glad to see that it is proposed, by arrangement with the Ministry of Munitions, to suspend the restrictions on new connections, and additional gas and electric fittings. As soon as they can get the goods, materials, and labour, the outdoor departments of gas undertakings may resume their activities. Ever since the armistice, the electricity industry has been yearning for this freedom. Perhaps now it will be happier.

Definite Tendencies in Gas Bills.

ONE cannot see much chance, through Private Bills, of gas legislation in the coming session developing any very notable feature, whatever may happen in connection with Government plans. But even in the few Gas Bills that have been promoted, one finds certain very definite tendencies. Established gas undertakings of various sizes are proposing to stretch their tentacles, so as to bring within the field of supply partially gas cultivated or wholly uncultivated areas. The trend of development is for residential property to spring up in the outer areas of towns; and there is a decided advocacy for industries to establish themselves more and more in country areas where there are means of transport and elbow room, and where the workers can be housed under healthy conditions, which is not always the case now in our overcrowded cities and towns. The great housing question, too, is being vigorously considered in its preliminary stages. All gas suppliers should be ahead of these movements towards loosening town concentration; and there should be a growing absorption of small gas-works, which can, as a rule, be gradually abandoned and supply be given to the advantage not only of the district concerned, but of the larger gas-works taking over the supply. In the coming session of Parliament, the Huddersfield Corporation will, in connection with gas-territory extension, be seeking power to amalgamate with their gas undertaking the Longwood and the Kirkheaton Gas Companies; and the Sunderland Gas Company are proposing to obtain possession of the South Hylton and Whitburn Gas Companies. Consolidation of gas supply in this way is good policy from the point of view of inherent advantage, let alone the fact that a solid front, flexibility and scope in operation, and the utmost economy realizable will be valuable factors as electricity develops on similar lines (as there is every prospect of its soon doing), under the schemes which certain Departmental reports have foreshadowed, and which recent speeches have shown the Government intend to promote in the belief that they are a national necessity. There is good certainty that in high political places there has been favourable to electricity an influence at work which is unseen by the general public. No such influence favourable to the gas industry is apparent; indeed, we know well, notwithstanding all the industry has done for the Government and the nation in the war, that such influence has no existence. The industry must therefore do everything possible to help itself.

Among other tendencies is seen a general disposition to obtain authorization to supply power gas. This is also a proper policy, as gas-works should be the chief centres of fuel service to industry, as well as for domestic supply—a fuel service which does away with air-polluting shafts, and introduces into factories the means for accelerated and constant production, as well as for saving labour and the cartage of solid fuel. Related to this are the powers which are being freely obtained for purchasing gas from outside producing sources. On the ground of national economy, this is a direction in which we must look for large developments. Middlesbrough, Leeds, and Sheffield have forged strong links between the coke-oven industry and town gas supply. An interesting development is supplied by the review of the Stocksbridge Bill this week. The gas-works of Samuel Fox and Co. and the United Steel Companies, Ltd., are to be vested in a separate Company, in which the old owners will be the shareholders to the amount of the agreed value of the plant. Statutory powers are now being sought, under which the new Stocksbridge Gas Company will be supplied with gas solely from the large coke-oven installation of the firms mentioned—the gas having a value of 400 B.Th.U gross, and must be delivered free from sulphuretted hydrogen, and at a pressure of 6 inches. Naturally, it is no use asking for a calorific standard in excess of the quality of the gas which is going to be purchased in bulk, and so 400 B.Th.U. gross is the proposed standard, with supply given to the consumers under a minimum pressure of 20-10ths. Incidentally, it may be mentioned that the Corporation of Huddersfield are asking for a standard of 450 B.Th.U.; and

it will be for the Corporation to prove to Parliament that modern developments in gas manufacture will enhance national and local economy with this standard, while for the modern users of gas a standard of this value is a fit and proper one. Another interesting feature of the Stocksbridge scheme is that coke-oven gas is to be paid for at a rate fixed on the price of coal. It is to be one-twentieth part of the price of coal delivered on to the works; the one-twentieth being subject to a quinquennial revision if the circumstances warrant it. We are of opinion that the Gas Company will be the first to require a revision of the one-twentieth part. It is a fair price if regard be had to the cost of gas into the holder in the case of the majority of gas-works. But this is a new Company; and therefore the basis of comparative cost should be with new gas-making developments. Steaming retort charges gives, according to the coal, a production of from (say) 15,000 to 20,000 c.ft. of from 450 to 500 B.Th.U. gas, with the cost into the holder reduced by the value of coke and other secondary products. There is ground here for calculation as to costs and thermal value of an instructive order in connection with the charge per 1000 c.ft. of one-twentieth part of the cost of the coal delivered. The cheapness is admitted on general current working for a works of the size; seeing that 8 million B.Th.U. are going to be delivered as gas to the Company for the price of a ton of coal. But comparison should now be on the capabilities of a concern newly starting, and having before it the pick of the most modern carbonizing system.

Another point that occurs in the Bills for this session has regard to prepayment gas-meters. There is no question that the installation and upkeep costs of prepayment systems will be greater in future in view of the higher charges for meters, fittings, cookers, materials, and labour. The model clauses allow for the hire of a prepayment meter without fittings 6d. or 10 p.ct. on the cost, whichever is the higher. The maximum extra charge for meter and fittings is 10d., or if a cooker is supplied 1s. Nothing whatever is said in these cases about an alternative of 10 p.ct. on cost. In their Bill, the Pembroke District Gas Company are proposing to raise the 10d. to 1s. 3d. and the 1s. to 1s. 6d.; but the Stocksbridge Company suggest the alternative of 10 p.ct. on the cost of meter, fittings, and cooker, which strikes us as being a much better proposal, as it will apply equitably to any level of installation cost.

Another tendency is that in almost every Company Bill, we find the promoters getting rid of the obligation to hold half-yearly meetings, and to have meetings only annually—paying, of course, an interim dividend.

Demobilization.

LABOUR and demobilization questions have had a prominent place during the past week. Demonstrations by soldiers and strikes in various trades have broken with somewhat vicious determination into the at home otherwise peaceful ushering in of the New Year. Labour in some industries intends to be first in preferring claims and in receiving attention. It regards it as its due that preferential consideration should be given to its demands in every detail. Justice to others and the consequences of the demands are matters that do not exercise in the slightest the mind of labour. With it there is no external interest. The forty-seven hours' week is being pressed for, and secured; in some quarters a forty-four hour week is being talked about; and the miners do not wish to do anything more exhaustive than work for six hours a day. The request has been made in one place that the forty-seven hour week shall be timed from home to home! War wages are to be defended as future normal wages. So the game of prosecuting self-interest goes on, and always under a threat of stoppage of work, and the promotion of public inconvenience. The demonstration of soldiers in connection with demobilization is another matter. There are soldiers who have good cause for grievance. There are others who, in comparison, have not; and some of these have been making most noise, and have shown a great deal of activity in fomenting discontent. In the military ranks there must be discipline; but what has been happening has spurred the Government to hasten the demobilization of those men who can be spared.

The principles, however, that the Government adopted for the release of men—pivotal men, and those who have employment awaiting them, as is the case in the gas industry, to have priority—have been met by the long-service men putting forward their title to consideration over men who only comparatively recently have taken up military duties. There is a good deal of sympathy with their submission; but it only forms one point for consideration in a complex situation. The German Army has not yet been demobilized; and the Allies must have a sufficient Army to ensure compliance with their Peace terms. The Army that will have to be maintained for a period longer must also have the elements for its service in strength sufficient for its needs, whatever they may be. The Army, of ample size and stability, has to see that the fruits of the past four-and-a-half years terrific war are not lost; and there must be no fooling about with this essential. A few months more patience there must be. But at the same time every man who can be spared should be spared to begin the re-supplying of man power to our industries, and to start their re-development so as to prepare the way for the reception of the industrial forces which will come with general demobilization. This is where the Government has failed. With the armistice its departments seem to have developed laxness, and to have lost the grip of things; and red-tape has commenced to assert itself once more with all its old deviousness and insistence upon the punctilious performance of an unnecessary amount of detail—in this case, before there can be a passing from military into civil life. Bureaucracy seems to lack severely all idea of invention in process to facilitate the doing of a thing; and custom and precedent always, somehow or other, get into the ascendant. Though opposed to irregularities such as the soldiers' demonstrations were last week, we cannot but recognize that some good on this occasion was done in activating matters at Whitehall.

Meantime, the gas industry would be glad enough to see a return of as many as possible of its skilled men. There is no embargo now upon the making of new connections, and so upon the development of business. While the embargo existed, the gas industry could take no part in the country's reconstruction work. All the same, the authorities dealing with demobilization certainly evince no great appreciation of the fact that the work of the men in the gas industry is far-reaching in creating employment in a number of industries—in those that are the sources from which materials, plant, and goods of all descriptions are drawn, and in those that are dependent on the productive results of their work. Perhaps further steps will be taken to enlighten them.

Steaming Horizontal Retort Charges.

HORIZONTAL retort-settings are in a great majority; and most of their owners are as desirous as the possessors of vertical retorts to realize any economy that can be secured from them. At one time, it looked as though the economic advantages of steaming charges would be largely the property of the vertical retort, and never be satisfactorily obtained from the horizontal type. There had been, before the advent in daily work of the vertical forms, a great number of failures with both the steaming of, and the admission of blue water gas to, the charges in horizontals; but these failures were chiefly due to the missing of some necessary detail. In the development of steaming in vertical retorts, success has only been due to patient investigation with the view of arriving at proper conditions; and when the work of steaming is gone about in a scientific way with horizontal retorts, good results are also realizable, but not the results that are possible with verticals. The conditions inside the retorts are altogether dissimilar; and therefore the methods that apply to steaming vertical retort charges will not apply to the steaming of horizontal retort charges. This is clearly proved by the article contributed to our columns this week by Mr. R. J. Rew, of the Devon Gas Association, Ltd., who has been making the process of steaming horizontals very much his own by the amount of energy put into it, and the success achieved. Mr. Rew shows that, in the matter of steaming, the horizontal retort clearly has limitations; but, despite them, the steaming is a paying proposition. What he does is, at the end of an eight-hour carbonizing period, to set-off a couple of retorts in a bed of (say) sixes or eights, and steam the spent charges in them for forty hours. It is preferable the two retorts should be of special construction; and such a retort is the subject of a patent. Then, again, superheated steam is an essential, whatever may be the case with vertical retorts; and great care has to be taken not to overdo the steaming. Further, maximum time-contact is necessary, which means low steam pressure and speed.

The reason that the steam cannot with horizontal retorts

be continuously applied during the whole carbonizing period as in continuous vertical retorts is that, with a comparatively shallow depth of semi-carbonized coal or partially incandescent coke in an incandescent retort, the production of carbon dioxide would be enormously increased. But providing the apparatus and methods are correct, during the forty-hour steaming period, good water gas is produced from the two retorts in a bed; and this at the same rate per retort as when making coal gas. The quantity of carbon dioxide is kept within a 5 p.ct. average, tested on the purified water gas. This is higher than the average with continuous vertical retorts; but in these days (when calorific value is a superior consideration to illuminating power) a little variation in the carbon dioxide is not a matter of great moment. The fact that the charges cannot be steamed continuously, as in vertical retorts, deprives the horizontal retort charges of the advantage of a change in gaseous atmospheric condition, the importance of which Prof. Cobb recently emphasized in the William Young Memorial Lecture. The hydrocarbons, too, are not accelerated and protected from degradation in their departure from the retorts, nor is there the additional hydrogen to pick up some of the remnant volatile matter from the coke.

However, horizontal retorts exist in greatly predominant numbers; and they are still voted by many engineers as the best for dealing with certain classes of coal. Therefore, part of the advantages of steaming continuous retort charges has perforce to be relinquished. Nevertheless, it is seen from Mr. Rew's article that, using four-fifths of Somerset coal and one-fifth of coal from South Yorkshire, upwards of 3000 to 4000 c.ft. of gas extra per ton are made; and considerably higher makes have been obtained with other varieties of coal. For instance, if all South Yorkshire coal were used, the make would be largely augmented. We notice that Mr. Rew does not say anything as to the calorific power of the mixed gas, nor does he give an analysis. Both would be of interest to his readers. However, there are the solid advantages of an increased yield of gas per ton, and the saving of coal and labour. These are credits which make a good impression on the revenue account of a gas undertaking, and put it in a stronger trading position, which is a condition which will be increasingly necessary. Small wonder then that Mr. Rew is able to point to some 140 gas undertakings that are making, or are proposing to make, a trial of the steaming process with horizontal retorts.

More Gas Oil and Liberty.

Owners of carburetted water-gas plants whose coal stocks are languishing, and whose coal deliveries are not showing the spirited activity that could be desired, will be pleased to learn that a fresh outlet to relief and freedom has been opened. An official notification in another column indicates that gas oil supplies are now available in greater volume, and that arrangements for deliveries may be effected direct, without pursuing the circuitous course which control over use has necessitated.

Nationalization.

It is hoped that the Government do not intend bending to the ultraists, and enter on a programme of so-called national reform which was not fully explained to, and endorsed by, the country during the General Election. Improvements in railway and transport services were mentioned, as was also a development of the electrical power of the country. But excepting what Mr. Winston Churchill hinted at Dundee regarding the railways, the country certainly did not understand that the nationalization of transport services and the electrical system (so far as transport and power are concerned) was contemplated. The Executive of the National Union of Railwaymen have been in London during the past week, and have been urging the claims contained in what is known as their national programme. They have interviewed the Premier; and he has asked them to suspend negotiations in respect of their programme, in view of the fact that the Government are resolved that the State shall, at the earliest possible moment, deal with the whole of the railways, transport services, and electrical (transport and power) industry. Sir Eric Geddes is to be Minister of Transport, and the necessary measures are to be passed speedily into law. At any rate, these are the intentions of the Government as gathered by Mr. J. H. Thomas, M.P., at the interview the Railwaymen's Executive had last week with the Prime Minister.

More Wages Wanted by the Miners.

The Coal Controller and the country are not out of the wood yet in the matter of increases of miners' wages. A further "substantial advance" is required by the men—the proposals from the various districts showing the wide variation of from 100 to 25 p.ct. The Executive of the Miners' Federation have recommended a further advance of 30 p.ct. on present wages; and the Coal Controller has been informed by them that this is the minimum. The gas industry must not be too expectant yet awhile as to cheaper coal at the pit-head; and for other than seaborne coal the cost of transport does not look very hopeful.

Housing Schemes and Electricity.

A very sharp look-out will have to be maintained by gas undertakings—especially those in trading competition with municipal electricity supply—to see that the electrical people do not steal a march on them, and impose on the prospective tenants of these dwellings, which it is expected will make life easier for the poorer classes of the community, an expense that their purses are not equal to bearing. For all-round use gas can beat electricity completely out of the field on the score of cost—initial and running; and local authorities have therefore no right to make use of these schemes for the purpose of procuring some advantage for their electricity concerns, and a disadvantage for the tenants of the houses. Judging from the amount of empty property in Hastings and St. Leonards, we should not have thought that a scheme for new houses was necessary; the landlords at any rate will not think so. Admittedly, improvement in the borough is requisite in some quarters; and it might have been of advantage to the town if the money that has been squandered on the electric undertaking had been utilized on work of more material advantage. Recently a proposal was made by a member of the Council that a Special Committee should be appointed to consider the question of housing, reconstruction, and development generally; and he submitted that the Electricity Committee should be represented upon the Committee. But he was careful not to suggest that the Gas Company had an equal interest in the matter, and that a representative of the Company might with benefit be co-opted on the Special Committee.

Misinformed.

The proposer of the resolution was Mr. Councillor Cox. In his remarks, he stated that electricity was to take a foremost place in reconstruction; but we should dearly like to know who was his informant that "the Minister of Munitions had already transformed several large works which were now engaged in manufacturing every conceivable appliance for heating, lighting, cooking, and for power suitable for the smallest dwelling to encourage cleanliness and health." It is obvious that he intended the assumption to be made that these appliances were electrical; whereas what has been done has been to make arrangements with the Ministry for the placing of orders for miscellaneous standard fittings—such as doors, windows, kitchen-ranges, baths, bolts, locks, door handles, and general fittings"—with the view of providing employment for as many munition workers as possible. We fancy that someone has been pulling the worthy councillor's leg. However, he did not succeed in carrying his motion; for an amendment proposed by Dr. Gray, deferring the consideration of the appointment of a Special Committee for three months, left Mr. Cox, his eloquence, and (so far as we are aware) his misstatement as to electricity without any support, or if there was any the newspaper report before us does not disclose the fact.

Gas-Fitted Model Dwellings.

The Local Government Board are pushing this matter of housing through the local authorities; and it is stated that, in conjunction with the London County Council, it is proposed by the Board to erect a village of model houses in London for the guidance of local authorities throughout the country, both as regards architectural style and internal arrangements. These houses will be built from plans which won the premiums in the recent competition by the Royal Institute of British Architects. The Board desire to keep complete control over the doings in this matter of the local authorities by having their plans approved, and by the holding of public inquiries. But meantime it appears the Office of Works are not taking kindly to what they regard as a

usurping of their position in this connection. Much of the work that the Local Government Board are proposing to do has already been done by the Office of Works. There are the 1298 dwellings at Eltham which this Government Department have erected for the housing of the workers at Woolwich Arsenal, and which are fitted with gas. Another estate is already being developed at Hendon by the Office of Works, and gas is also utilized there to a large extent for the purpose of giving the tenants as much labour-saving convenience as possible at a cheap rate. Besides gas-lighting and cooking, water heating is a prominent feature; and the parlours have a connection for a gas-fire. There is, however, still room for extensions for the intermittent use of gas. It may be assumed that, a Government Department having this Hendon scheme in hand, it should serve as a sufficient model for local authorities, and that the proposal of the Local Government Board and the London County Council is superfluous, and only means further delay. However, whatever is done, it will be the business of the National Gas Council and the British Commercial Gas Association to look after the interests of the gas industry, and render all possible aid to the Government Departments.

Water Heating by Gas in Small Houses.

A point arises relating to water heating by gas in the type of houses in question. Messrs. John Wright and Co. call attention to it in our "Correspondence" columns. There will, in their opinion, be difficulty where local authorities have put the minimum storage capacity of water-heating apparatus at a figure in excess of what is necessary for small houses. They submit that a maximum of 12 gallons for the storage is quite sufficient in these houses; and that it is to the interest of the householders and the gas industry alike that this figure should not be exceeded. There is a question of economy here, affecting not only the tenants but structural costs; and the point should be brought by our central organizations before the authorities who are dealing with this matter. Such a storage should be ample, especially where gas-coppers are fitted for washing days. However, at Hendon we note storage cylinders of 20-gallons capacity are being employed—a cut-off valve being used so that the amount of water heated can be reduced to 5 gallons. This arrangement meets a good range of requirement.

Shortness of Labour.

A concrete example of the difficulty which is being pretty generally experienced during the transition from war to peace conditions is furnished in the case of Teignmouth, where, owing to shortness of labour in the retort-house, there has again been a failure of the gas supply. This trouble has existed there for weeks. In November the supply had to be stopped because, as is now explained, the flues of the boiler had become choked through want of attention which, in the absence of men, could not be given; and yesterday week there was another breakdown—the manufacture of gas failing to keep pace with the demand. Part of the trouble is, no doubt, due to the poor quality of the coal which is received at the gas-works under the rationing scheme; but the main difficulty is want of men. Some of the stokers have found more tempting jobs with better pay and no week-end work; and the staff have on some occasions been reduced to two or three men, who, in spite of almost continuous labour, had been unable to keep things going. In the meantime, there are old employees of the Company who are serving in the army, and will doubtless be discharged in due course. The Gas Manager (Mr. H. Higham) told the District Council last week that he had been to the local headquarters of the Demobilization Department at Exeter, with a view to getting these men released, and he had some hope that his application would be successful. The difficulty in this, as in so many cases, is that so much apparently unnecessary delay occurs between the application for men and their return to civil life. Judging by what is reported as to the increase in the number of unemployed, there would seem to be lack of discrimination in the men released from army and navy service. If those who have no immediate prospect of work are allowed to go, while others who have places open for them are kept on, it is easy to understand why there is dissatisfaction in the services. It is certainly all wrong from the industrial point of view. In any case, Mr. Higham is to be sympathized with in the difficulties which have attended his entry upon his new position as Manager at Teignmouth.

PERSONAL.

Mr. THOMAS SHADBOLT, who was Engineer and Manager to the Swindon United Gas Company, has left their service; and Mr. W. E. HARRIS is Manager *pro tem.*

After having worked hard for the country during the war, Sir ARTHUR DUCKHAM, K.C.B., of the Woodall-Duckham Vertical Retort and Oven Construction Company, Ltd., has, we are pleased to learn, now been released from his chief administrative posts in the Government Departments, and is returning at once to his business. He will, however, continue to do a certain amount of Government work, and has placed himself at their disposal for special work, should his services be needed.

In a long list of promotions in, and appointments to, the Most Excellent Order of the British Empire, for services in connection with the war, we notice the names of Prof. J. W. COBB (Commander), Livesey Professor of Coal Gas and Fuel Industries at the Leeds University, and Deputy Inspector of High Explosives, Ministry of Munitions, Leeds Area; Mr. THOMAS CURR (Officer), of the South Metropolitan Gas Company; and Mr. GEORGE PATE (Officer), Managing Director of the Carron Company, and a member of the Edinburgh Munitions Board of Management.

One of four gentlemen who have just been honoured by appointment as Deputy Lieutenants for the County of Northampton is Lieutenant-Colonel G. S. EUNSON, T.D., the Engineer and Manager of the Northampton Gas Light Company. He is an old Volunteer and Territorial Officer; and on the outbreak of war, he won rapid promotion from Captain to Lieutenant-Colonel, and was given the command of the 3rd/4th Northants Territorials. He was placed on the Territorial Reserve on taking over the command of the 2nd Volunteer Battalion, Northants Regiment. He is a member of the County Territorial Force Association.

To the honours already gained by him during the war, Major ALAN STEIN, M.C., son of Mr. J. G. Stein, of Millfield, Polmont, has added still another, in being mentioned in despatches by Sir Douglas Haig. The mention is the second that Major Stein has gained; the first having been in April, 1915. Major Stein, who was a Lieutenant in the local Territorial Battalion (the 7th Argylls), proceeded with the battalion to France, and was wounded at St. Julien, in April, 1915. In January, 1916, by which time he had been promoted to the rank of Captain, intimation was made of the award of the Military Cross; and shortly afterwards he was appointed Adjutant. In October, 1916, he was promoted to the rank of Major. In November, 1917, there was recorded the award of a "bar" to his M.C.; the second award being for good work while commanding a company of the Argylls. Afterwards he was attached to the Gordon Highlanders.

The Directors of Messrs. Alder & Mackay, Ltd., of New Grange Works, Edinburgh, desire to return thanks for the large number of expressions of sympathy that have been received from friends connected with the gas industry and kindred trades, also Associations and business houses, through the lamented death of their Managing Director, Mr. John H. Bennet.

OBITUARY.

The death occurred on the 27th ult. of Mr. JOHN M. JACKSON, the proprietor of the business of Messrs. G. B. Jackson & Son, Brazenose Street, Manchester.

Mr. T. P. RIDLEY, the Secretary of the Newcastle-upon-Tyne and Gateshead Gas Company, has had the misfortune to lose his wife, who died at Whickham on the 9th inst.

The death is announced of Mr. WILLIAM ALLARD, who was Mayor of Kingston in 1893, and had for some years served on the Surrey County Council, as well as being Chairman of the Health Committee and a Magistrate for the County of Surrey and the Borough of Kingston. Recent contributions of his to the "Correspondence" columns of the "JOURNAL" showed that he had a good grasp of the position of the gas industry, and held very progressive views on the subject.

Oil for Carburetted Water Gas—Official Notification.—Owing to supplies of gas oil now being available in greater volume, gas undertakings engaged in the manufacture of carburetted water gas may make arrangements for the supply and delivery of gas oil direct with suppliers, instead of through the medium of the Pool Board (Petroleum Supplies) as hitherto.

Temporary Increase of Charges Act.—The Local Government Board have granted an Order under the Statutory Undertakings (Temporary Increase of Charges) Act to the Burnley Corporation, raising the maximum charge for gas within the borough from 3s. to 3s. 6d.; and one to the Ramsgate Corporation, with a rise from 5s. to 7s. 6d. per 1000 c.ft. The Board have received an application for an Order from the Rickmansworth Urban District Council. The Board of Trade have made orders in favour of the Ely Gas Company, the Folkestone Gas and Coke Company, the Swansea Gas Light Company, the Great Yarmouth Water-Works Company, the Staffordshire Potteries Water-Works Company, and the Lowestoft Water and Gas Company. Application has been made to them for an Order by the Ogley Hay and Brownhills Gas Company.

MORE GAS AND ELECTRICITY.

Twenty-Five P.Ct. Increase to Household Consumers.

THE moderation of the heavy demands made upon gas and electricity for industrial purposes consequent upon the armistice has enabled a larger supply to be placed at the disposal of household consumers. The Controller of Coal Mines has therefore agreed that, commencing with the New Year, the allowances of gas and electricity for fuel and lighting under the Household Fuel and Lighting Order, 1918, shall be increased by 25 p.ct. For the present this concession relates only to England and Wales, and does not apply to Scotland. At the same time, it is proposed, by arrangement with the Ministry of Munitions, to suspend all restrictions on the fitting of gas and electrical equipment.

The official order is as follows:

GAS AND ELECTRICITY.

Variation in Conversion Equivalents.

(1) The Controller of Coal Mines, in exercise of the powers conferred upon him under clause 7 of the above Order, hereby gives notice that the conversion equivalent for gas in terms of fuel shall be increased to 18,750 c.ft. to the ton and for electricity to 1000 B.T.U. to the ton as from the meter readings taken for the close of the quarter ending Dec. 31 last (except in those cases in which a higher conversion equivalent has already been specially agreed).

(2) Further, the Controller of Coal Mines determines that the allowances for lighting under clause 8, or the special assessments for lighting agreed under clause 12, of the above Order shall from such meter readings be likewise increased by 25 p.ct.

(3) Such variation in the conversion equivalent for lighting allowances shall be without prejudice to any action taken, or to be taken, in connection with excess consumptions of gas or electricity in the quarter just closed.

(4) Further, under the powers conferred upon him by clause 4 of the above Order, the Controller of Coal Mines agrees to the suspension of clause 99, referring to the restrictions on gas and electrical fittings, as from the date of this notice.

Scotland does not yet benefit under the new regulation. It is, however, stated that, even with the concession now made, the Scottish household has rather a larger allowance for fuel and lighting than prevails in the South. The original allowance for the North was about 20 p.ct. greater, because the nights there are longer and the weather colder.

ACIDITY OF SULPHATE OF AMMONIA.

By P. C. GARDINER, of the Tottenham Gas-Works.

THE very general interest now being taken in "neutral sulphate" warrants an investigation into the cause of the acid reaction given by all commercial salt which has not undergone special treatment for its neutralization. Without attempting to go into the maximum acidity permissible for various purposes, it is of the greatest importance to get satisfactory evidence of how the acid is held by the salt—*i.e.*, whether it adheres to the outside, or is actually contained in the crystals themselves. With this object in view, a number of samples were taken from the salt fished from an open saturator; the only difference being the period allowed for draining, which varied from minutes in the case of sample A to weeks in the case of sample C. The analyses of these samples are given below:

A	1·442 p.ct. acid by weight	
B	0·388	,, ,,
C	0·165	,, ,,

The substantial reduction in the acidity after long draining is sufficient to indicate that the bulk of the acidity is on the surface of the crystals; and, as will be seen by the following table, confirmatory tests made by washing the samples successively with equal quantities of neutral water show practically all the acidity to be eliminated by the first washings.

—	A. Grams H_2SO_4 per 100 Grams Sulphate.	B. Grams H_2SO_4 per 100 Grams Sulphate.	C. Grams H_2SO_4 per 100 Grams Sulphate.
First washings	0·620 = 43 p.ct.	0·250 = 64 p.ct.	0·054 = 33 p.ct.
Second ,,	0·500 = 35 ,,	0·120 = 31 ,,	0·094 = 57 ,,
Third ,,	0·280 = 9 ,,	0·010 = 3 ,,	0·017 = 10 ,,
Fourth ,,	0·028 = 2 ,,	0·005 = 1 ,,	*Nil*
Fifth ,,	0·014 = 1 ,,	0·003 = 1 ,,	,,
Sixth ,,	*Nil*	*Nil*	,,

The fact that in each case no acidity whatever is shown in the solution of the last portion of the salt, consisting as it does of the centre of the crystals, and the merest trace only in the fourth and fifth washing, it may be deduced that no acidity exists in the interior of the crystal itself.

The proportions of the acidity found in the various extracts are in themselves interesting and instructive when it is explained that in experiment C the salt was washed on a filter, and the extracts allowed to drain. In the case of experiments A and B, however, a filter pump was used to draw the extracts through; thus enabling more liquor to be included in the first, which consequently contained a higher proportion of the acidity than in the case of C. In a subsequent test, the filter was left under the pump longer, and as high a proportion as 79 p.ct. of the acidity was obtained in the first washing.

In order to dispel any fears which might be entertained of neutral salt containing approximately equal amounts of free alkali in different parts of the crystals, a further similar series of tests were made on a sample of salt testing neutral when dissolved; but no variation from the neutrality was found in any extract.

DIGEST OF PATENT CASES.

As a supplement to the "Illustrated Official Journal (Patents)," there has been compiled by Mr. Frank G. Underhay, M.A. (one of the Editors) a digest of patent cases reported in 1918. There were in all less than a score of these cases; but, as usual, there were points of interest raised by some of them.

For one invention, which the Court held to be very meritorious, and the non-user of which had been satisfactorily explained, an extension of seven years was granted as to some of the claims—this to be effected by the grant of a new patent for that period from the date of the expiration of the original patent. An extension of five years was granted in two other cases, on certain conditions; the inventions being very useful, and the remuneration of the patentees having been inadequate. A mere discovery is, it was declared, not sufficient to justify the granting of a patent. Another case related to a patent granted in 1912 for an improved high-speed tool steel, produced by the addition of up to 15 p.ct. of cobalt to the known compositions hitherto employed for the purpose. A petition was presented for the revocation of the patent, on the grounds of prior user and want of subject-matter; the petitioners alleging that they had sold before the date of the patent a high-speed tool steel into the composition of which cobalt entered. The patentees maintained that the user had been experimental, and that the composition of the steel had not been published. The Court, however, held that the user had not been experimental, that substantial sales of the steel had been made, that the composition of it could be ascertained by analysis by purchasers, and that the patent was invalid. An appeal to the House of Lords has been dismissed. Where a patent was held to be invalid, and the patentees were alien enemies, the Court of Appeal refused, in the circumstances of the case, to suspend the order so that after the termination of the war the patentees might have an opportunity of applying to amend the specification. In this case, also, an appeal to the House of Lords was unsuccessful.

Women Workers in the Gas Industry.

Commenting upon the fact that men are returning to the gas industry in the United States, and that thought is being given to the woman worker, the "American Gas Engineering Journal" says that undoubtedly the gas industry owes the woman worker the utmost consideration. In some instances she exceeded expectations to such an extent that there will be real reluctance to again give men such tasks. But to our contemporary there appears little need of dispensing with the woman worker at all—even if every man who had left were to come back, which by no means will be the case—for there are many features of gas company work wherein women are infinitely more efficient than men. It is urged therefore that the industry should use the women that have already been trained in such work, and find a place for the men in other tasks—which are innumerable. For example: "Intensive work to raise the consumption of the unprofitable consumer would be remunerative, even at considerable expense. Profits would come here not only in merchandize sold and increased consumption, but in the elimination of a positive expense. Gas lighting would profit by increased maintenance service. In fact, gas lighting will inevitably be lost without it. Super-service in all respects requires an adequate force of employees. Few companies gave super-service in the past. In future, all companies must give it to live."

Supplying Compressed Gas in Berlin.—In connection with the Lichtenburg Gas-Works at Berlin, arrangements have been made for the supply of compressed gas at several points in a large area. From particulars appearing in the "Journal für Gasbeleuchtung," it appears that at present three pumps draw gas from the large holders, and compress it to a density of 14 to 16 atmospheres. This gas, after cleaning, drying, and cooling, is stored in four retainers for the supply of the district from certain chosen points in the area provided for. The three pumps will compress 500 cu.m. each of gas an hour. Shortly a larger compressor will be installed capable of compressing 1000 cu.m. an hour. The maximum demand at present is 30,000 cu.m. a day, to meet which the pumps have to work twenty hours. The railway companies find it convenient to take this ready-compressed gas for the lighting of their passenger carriages.

GAS BILLS FOR 1919.

[We shall be pleased to receive notification from Parliamentary Agents and others as to any late promotions of Gas Bills that may have been made, in accordance with the intimation of the Lord Chairman of Committees that such promotions would be entertained this session.]

[SECOND ARTICLE.]

WE continue to-day the review of the Gas Bills promoted for the coming session of Parliament.

The next Bill to be noticed is that of the Northampton Gas Company. By the Company's Order of 1904, capital conversion powers were obtained; and the consolidated stock now consists of £279,196. Under the same Order, authority was given to raise further sums to the amount of £100,000; and there is now £63,112 unissued. The Company have borrowed £51,250 in debenture stock, leaving a balance of £25,000. The Company ask for an extension of the limits of supply, also new lands and works powers, to the latter of which the "Model" residuals clause is appended with the one-third purchasing restriction. Additional capital powers are sought to the amount of £130,000. Supplementing the sums already borrowed, the Company desire to borrow £70,000; and subject to the granting of this, the prior powers, so far as they have been unexercised, are to be repealed. Sanction is also desired to the issue of the unauthorized preference and debenture stocks as redeemable stocks. It is proposed that dividend on the additional ordinary stock issued (other than consolidated stock) shall be at the rate of 7 p.ct. per annum, and on the preference stock 5 p.ct. Among miscellaneous clauses, authority is sought to establish a benefit fund and to grant pensions, &c. [*Parliamentary Agents: Messrs. Vizard, Oldham, Crowder, and Cash.*]

The Pembroke Docks and Town Gas Company, Ltd., have issued £10,000 of original 10 p.ct. capital, £2000 of additional 7 p.ct. capital, and £19,450 (with £904 premiums) of new capital out of a total of £25,000 authorized. Debentures, carrying 6 p.ct. interest, amounting to £8350 have been issued out of £12,333 authorized. The Company are now in Parliament desiring an extension of their limits of supply, and incorporation as the Pembroke District Gas Company. The proposed capital is £131,450, of which £31,450 is to be called the original capital. This original capital, it is suggested, shall be divided into £10,000 of ordinary "A" stock, and £21,450 of "B" ordinary stock. Of the additional capital of £100,000, it is sought to have the right to issue preference shares to an amount not exceeding £65,720. The Company ask for borrowing powers in the now usual proportion of one-third part of the paid-up ordinary capital; and power is desired to issue authorized preference or debenture stocks as redeemable stocks. It is proposed that the standard rates of dividend be 10 p.ct. on the "A" stock and 7 p.ct. on the "B" stock. Provision is made for reserve and special purposes funds and for annual meetings. Lands and gas-works clauses are included, with the model form of residuals clause, imposing the one-third purchasing restriction. A standard price of 5s. is asked for, with the sliding-scale operating on the usual terms. The prepayment meter clause proposes a variation from the ordinary 10d. and 1s. by substituting 1s. 3d. as the maximum extra charge, and 1s. 6d. if the fittings include a cooker. A calorific standard of 500 B.Th.U. is desired; but pending the provision of a new testing-place and the necessary apparatus, an illuminating power standard of 14 candles is to apply. Until the calorific power standard comes into operation, a pressure of 8-10ths is to be the minimum, and thereafter 15-10ths. A number of other clauses of ordinary form are included; among them provision being made for a benefit fund, the payment of pensions, &c. [*Parliamentary Agents: Messrs. Sherwood & Co.*]

The Sheringham Gas and Water Company are seeking to bring into their parliamentary authorization a number of modern and additional powers. By their Act of 1898, the Company was constituted a maximum dividend one, with power to pay back dividends, in lieu of the standard price and sliding-scale of dividend dependent upon the profits of each particular year fixed by the Order of 1888. But the price which the Company might charge for the supply of gas was not limited; and it is now asked that the maximum price shall not exceed 6s. 6d. per 1000 c.ft. The Company desire a calorific power standard of 500 B.Th.U., with a pressure of not less than 15-10ths. The Bill embraces a number of clauses relating to the water undertaking. Then it is seen that annual meetings are arranged for. The financial clauses include a proposal that the provisions of section 6, relating to additional capital of the Order of 1911 (in so far as they limit the amount of the additional capital to be issued as preference stock), shall be repealed, and that authority shall be given to issue the whole or such portion as the Directors may think fit of this additional capital as preference stock; and it is also the wish of the promoters that the rate of dividend upon such stock shall be left to the discretion of the Directors. Power to issue the preference or debenture stocks under the Order of 1911 as redeemable stocks is also sought. Authorization as to a profit-sharing scheme and the establishing of a benefit fund forms part of the Bill. [*Parliamentary Agents: Messrs. Lees & Co.*]

The Stocksbridge Gas Company's Bill is for the purpose of incorporating a new Company under circumstances which are detailed in both the preamble and the second schedule to the measure. The latter is constituted of a long agreement between Samuel Fox & Co., Ltd., and the United Steel Companies, Ltd., of the one part, and Francis Scott Scott-Smith, on behalf of the Stocksbridge Gas Company of the other part. In connection with their extensive steel works, Messrs. Fox & Co. have works for the manufacture of gas; and they have been supplying with gas the parish and urban district in the neighbourhood as well as within part of the parish of Wortley and the rural district of Wortley. They have lately erected a large coke-oven and bye-product plant, from which there will be available a considerable quantity of gas for use for lighting, heating, power, and other industrial and domestic purposes. The Steel Company own almost the entire share capital of Samuel Fox & Co., which it is intended shall be shortly put into liquidation, so that their assets may become vested in the Steel Company. The new Gas Company have agreed to purchase the gas plant, mains, appliances, &c., for £7000, and such further sum as shall be equal to the amount expended by the Company or the Steel Company on capital account for gas supply from the date of the agreement to the date of completion. The payment of the £7000 is to be satisfied by the issue of 700 £10 shares. The new Company are to take coke-oven gas up to the amount they may require from day to day; but the supplying Company are not to be under any obligation to furnish a greater quantity on any single day than 300,000 c.ft. The gas is to be delivered at a pressure of not less than 6 inches into the main at the meter-house. It is to have a calorific value of not less than 400 B.Th.U. gross, and is not to exhibit a trace of sulphuretted hydrogen. The plan of payment for the gas is interesting. It is to be a price equal to one-twentieth part of the average price per ton (based on the market rates prevailing from time to time in Sheffield for coal of the quality used by the supplying Company) of coal delivered during the quarter into works at Sheffield having a railway siding thereon. Either party will be entitled to ask for a revision of the terms at five-year intervals; and, failing agreement, arbitration is provided for. In the event of failure of the supply in respect of quantity or quality, the Gas Company are not to be precluded from purchasing gas from any other source during such failure, and all reasonable costs over and above the amount which would have been paid to the supplying Company are to be borne by them. The latter are also to indemnify the Gas Company against, and reimburse to them, the amount of any penalty or forfeiture incurred through failure. As to the part of the supply district within the area of the Sheffield Gas Company, it is asked that it shall be excluded from their district. Succeeding clauses deal with the incorporation of the Company, with a capital of £39,000—that is, £7000 of original capital and £32,000 of additional capital. The original capital, it is proposed, shall carry a dividend of 10 p.ct., and the additional capital 7 p.ct. on the part issued as ordinary, and 6½ p.ct. on the part issued as preference. Borrowing powers up to one-third part of the capital raised are asked for, and authorization to issue the preference or debenture stock as redeemable is desired. But the "additional" capital powers are not to be exercised to any greater sum than £8000 unless and until the Company have themselves resolved to manufacture gas and to erect works for the purpose. Annual meetings and balance-sheets are provided for. Lands, works, and residual powers (*minus* the one-third purchasing section) are included in the Bill. The limits of supply are defined, provision made for the repeal of the rights of the Sheffield Gas Company to supply in part of the area, and the price of gas is limited to 5s. per 1000 c.ft. The prepayment meter clause is in the ordinary form, except that, in addition to the power to charge an extra 10d. for the hire of meter and fittings and 1s. if a cooker is included, the Company desire to have the right to the alternative charge of 10 p.ct. on the cost of meter, fittings, and cooker. The calorific power standard is put at 400 B.Th.U., with a pressure of 20-10ths. Confirmation of the agreement already referred to forms the subject of a clause appearing among a number of others of ordinary character. [*Parliamentary Agents: Messrs. Dyson & Co.*]

ELECTRICITY SUPPLY MEMORANDA.

THE big electric power super-stations which it is proposed to construct in this country are as yet only in printed skeleton form; and their actual possibilities in producing economy are bound in such a mass of vagueness that it is impossible to form any adequate judgment respecting the likelihood of economy production. The Government ought very seriously to investigate this matter before proceeding to act on the reports that they have received from Departmental Committees. There has been adequate criticism of the findings of the Committees to justify this—criticism not confined to the question of the constitution of the Board of Electricity Commissioners and the District Boards, but extending to the more material one for the nation of safety from the financial point of view. The Government should not proceed to commit the country to a change of electrical policy based only on the barest of generalities. The Darlington Corporation are now endeavouring to stimulate a protest from municipal authorities against the recommendations of the Board of Trade Electric Power Supply Com-

Super-Station Generalities.

mittee as to the purchase of their generating stations and transmission lines. They also ask the Government to institute a completely exhaustive inquiry by some competent and independent authority, in order that accurate data may be forthcoming as to the statements and findings in the Committee's report. There is such seething discontent over the whole matter that the Government should not enter blindfolded upon such an immense project before assurance as to financial stability is established beyond all doubt. With generalities as the foundation, the risk should be too great for the British Government.

Transmission Costs.

If the scheme is proceeded with, it will be under conditions as to costs of capital, materials, and labour without compare since the advent of public electric supply. But constructional costs are not the only ones for consideration. There is a large amount of technical opinion unsatisfied as to the costs of transmission. This is an aspect of the question that has frequently received attention in these columns; and the "Electrical Times" has been very persistent in asking that it shall not be ignored, as it is being on all hands by those favourable to super-stations, and who regard such stations as the alpha and the omega of all questions as to economy. Economy from such stations should be considered at the point at which the current is delivered into the town distribution cables; and very good reasons have been shown for this. Coal or coke transmission may be equally as cheap as electrical transmission, as may be also the transmission of gas at high pressures. Mr. H. E. M. Kensit has, in an article in the "Electrical Times," shown that transmission is one of the most important elements in the whole question of cost. It is true his article is based upon what is done in connection with the Niagara system of the Hydro Electric Power Commission of Ontario, Canada. Nevertheless, it is illustrative of the costs of electrical transmission. It is a clear case of transmission free of all costs of generation. The Commission supplies some 115 municipalities; and the system reaches a point 250 miles from the source of the generation of the energy. The power is sold to each municipality at the cost price to the Commission at Niagara, *plus* the proportionate share of the cost of transmission, which includes interest, sinking fund, depreciation, maintenance, loss in transformers and line, and any other costs of operating the system. Mr. Kensit has picked out the data referring to twenty-four of the municipalities as being representative for different distances. The cost of transmission is seen to range from 22 to 86 p.ct. of the total cost of power delivered, according to distance and the amount of power transmitted, and that some 60 to 70 p.ct. of the costs of transmission represents the capital charges. On this large and varied system, the cost of transmission averages roughly 50 p.ct. of the total cost of power as delivered in bulk. This is not a negligible matter. In view of the interest attaching to the question, Mr. Kensit and the "Electrical Times" will forgive the appropriation by us of half-a-dozen columns from a cross-page table accompanying the article, showing the cost of transmission for the twenty-four municipalities selected to bring in the factors of distance and varying quantity:

Name of Town.	Distance from Niagara. Miles.	Power Delivered. E.H.P.	Per H.-P. Year. Total Cost.*	Portion Due to Transmission.	Per Cent. Increase Due to Transmission.
Niagara Falls .	..	2,304	[illegible] 50	$2·50	21·7
St. Catharines .	11	4,520	14·00	5·00	35·7
Welland . . .	20	4,283	14·00	5·00	35·7
Dundas . . .	51	597	14·00	5·00	35·7
Hamilton. . .	54	11,622	14·00	5·00	35·7
Paris	74	357	21·00	12·00	57·2
Guelph . . .	76	3,075	20·00	11·00	55·0
Toronto . . .	90	50,167	14·00	5·00	38·0
Kitchener . .	95	4,280	20·00	11·00	55·0
Woodstock . .	95	1,331	21 00	12·00	57·2
Princeton . .	96	10·3	66·00	57·00	86·5
Stratford . . .	121	1,519	27 00	18·00	66·7
London . . .	121	8,552	21·00	12·00	57·2
St. Mary's . .	134	397	28·00	19·00	68·0
St. Thomas . .	134	2,038	26·00	17·00	65·4
Ailsa Craig . .	144	80	50·00	41·00	82·0
Granton . . .	145	41	49·00	40·00	81·5
Chatham . . .	192	889	31·00	22·00	71·0
Dresden . . .	208	71	43·00	34·00	79·0
Bothwell . . .	214	63	59·00	50·00	84·7
Comber . . .	216	20	56·00	47·00	84·0
Windsor . . .	237	1,852	38·00	29·00	76·4
Walkerville . .	237	1,972	38·00	29·00	76·4
Sarnia . . .	251	1,126	38·00	29·00	76·4

* The cost of power in bulk at Niagara is $9 per H.-P. year in all cases.

The figures are very instructive and valuable, seeing that the expenses of distribution are kept absolutely distinct, and no profit is made on transmission.

Municipal Attacks on Company Management.

The report which was commented upon in the "Memoranda" in the "JOURNAL" for Dec. 31, on the subject of electricity supply in Greater London, has been issued in more extended form; and it is found that prejudice against private enterprise freely permeates the document. It will be remembered that it emanates from a "Conference of Local Authorities owning Electricity Undertakings in Greater London," and that a "Greater London Electricity Board" was proposed to control super-stations for the generation of electricity for supply to authorized distributors. It is suggested that the purchase powers of the London County Council should be transferred to the Board, and that only local authority representatives should have place upon the Board. From estimates prepared by the conference on the ultimate electrical requirements of Greater London, it is found that on a "moderate basis" upwards of 5000 million units of energy per annum will be needed. A variation of only 0·1d. per unit would therefore involve a sum of more than 2 millions sterling per annum. The remarkable computations that have been made over electrical regeneration in this country have carried us into high finance; and it would be of interest if there was greater disclosure as to how the figures were arrived at. But it is the venomous attack that is made on the supply companies that is really the most notable feature of the report. The word "monopoly" has a sharp ring about it when uttered by public authorities whose greatest ambition is to rule the electrical roost; but they themselves desire an electrical monopoly of a peculiarly definite character. Those who are engaged in private electrical enterprise in London are designated in the report as "private adventurers." The President of the Board of Trade must be a "private adventurer" of the first water; for he has had large interest in the electrification of subterranean London for the transport of human beings. No doubt every individual concerned in concocting and approving this report is a "private adventurer" in some form or other. The gas, water, and traffic services were all the original work of private enterprise, and not of the local authorities; and so private enterprise, the public benefactor, is considered a fit subject for a species of hooligan attack. The electrical companies were pioneers in electrical enterprise in the areas within which they operate while the local authorities hesitated to move; and assuredly, therefore, the companies deserve credit for what they have done. All these attacks upon private enterprise, and attempts to push it out from participation in electrical development, is in very bad form. But local authorities do not appear to be troubled by questions of bad form or anything else. The drafters of the report, to show how good the municipal suppliers of electricity have been in the matter of charges as compared with the companies, include a table showing that in 1904-5 the average municipal price in London per unit sold was 3·1d.; and the average company price 3·7d.—a difference in favour of municipal working of 19·4 per cent. By 1913-4 the average price of the municipal concerns was 1·77d., and of the company concerns 2·38d.—a difference in favour of municipal concerns of 34·5 p.ct. The reporters have judiciously avoided making any allowance at all for the appropriations from the rates from time to time of several of the municipal concerns; nor do they draw attention to the differences in the character of the demand between the company and the municipal areas taken as a whole. The latter have the pick of the industrial areas to bring down their average charge through power supply; the companies have the residential and shopping areas and comparatively little power supply. We should like to see the business dissected on which the figures in the report are based. The dissection would a tale unfold of an attempt to impose by a cunningness not of a clever order.

A Use for Surplus Generating Power.

Munitions production having now largely ceased, there will be a fair amount of spare generating power at electricity stations in industrial areas, which it may take a little time to bring into profitable use. In some cases, the demand for munitions has been of such enormous proportions that the responsible managers of the stations have been somewhat doubtful as to what are the possibilities of making use of the generating plant that will become idle. "Electrical Industries" calls attention to a suggestion by an American paper, that the stopping of munitions production offers an excellent opportunity for electricity stations promoting the cooking and heating load. "The electric cooking opportunity is with us," says our American contemporary. "Make the most of it." And "Electrical Industries" adds "Do it now." But unfortunately for the success of this incitement to do evil, the spare productive power that has been engaged on munitions works is in industrial areas, where the scope for electric cooking and heating is not of the best. It is in other areas where a few dolts may be captured.

Electricity as an Industry Destroyer.

The "Daily Mail" the other day published an article under the heading of "Power Miracles" written by one "John Chester"—a gentleman who seems to live up in the clouds, and to swallow a vast amount of pabulum that other visionaries choose to place before him. It is men like these who would legislate for the ruin of the country in the belief that they are doing it good. "John Chester" has got hold of the report of the Coal Conservation Sub-Committee of the Reconstruction Committee; and he believes that the steam-power plant of our factories is all going to be scrapped, and that the consumption of coal per horse-power-hour is to be reduced from 7 lbs. to 1·57 lbs. by the adoption of electric power. The total annual saving is to be 55 million tons of coal, and not less than 100 millions sterling. That "John Chester" does not happen to have in his possession a grain of salt is shown by the remark: "These are facts in a nutshell." Super-power stations, the carbonization of

coal, the extraction of valuable bye-products, and the use of gas-engines are the means by which the "miracle" is to be accomplished. The gas industry and the coal seller are going to have a bad time—in fact, they are on the brink of destruction. "Lighting, heating, and cooking will be done entirely by electricity." No more fouled air; and the city clerk will be able to wear a white linen collar for a whole week, so that laundries are to share in the bad times. Higher wages and shorter hours will be another result. "But we shall not get cheap power without a fight. There are all sorts of corporations, municipalities, and private individuals who have vested interests in the existing system. There are over 600 electric undertakings alone which will be affected. They are doing work which should be done by sixteen. Then there are all the gas companies, the coal merchants, and the steam-engine drivers who must find other work to do. It is no use disguising the facts; it will be a stiff fight. We shall not win unless we all take an interest in the new scheme, and fight hard for it." How the "Daily Mail" can be responsible for the dissemination of such twaddle as this, we do not know. But perhaps our morning contemporary desires to maintain its reputation.

A Spiteful Electric Radiator.

A Dundalk paper reports that, during the taking of the depositions at a Special Court the other day, smoke was observed to be issuing from the magisterial bench. Flames soon burst out inconveniently near to the legs of the presiding Magistrate. It was found that the fire was caused by the connections to an electric radiator. This was a bit spiteful, as the presiding Magistrate is a shareholder in the Gas Company.

THE VALUATION AND METHODS OF ANALYSIS OF SPENT OXIDE.

By HAROLD G. COLMAN, D.Sc., and E. W. YEOMAN, B.Sc.

I.

DURING the past few years a large number of papers have been published dealing with different points in connection with the analysis of spent oxide; and the present time seems to be opportune for a general consideration of the subject, and of the relative accuracy and advantages of the various methods.

By far the larger amount of spent oxide is employed as a source of sulphur in the manufacture of sulphuric acid; and the most important analytical determination required is that of the sulphur present in it. The only other constituent of the material of commercial value is the prussian blue it contains; but, in addition, it always contains ammonium thiocyanate (sulphocyanide), which is mostly a disadvantageous impurity, and for certain purposes an estimation of the amount of this substance and of the total ammonia is also required. It will be convenient to consider first the more important question of sulphur content, and then deal with the analysis of the material for the minor constituents.

DETERMINATION OF SULPHUR.

Much the larger proportion of sulphur in the spent oxide is present as free sulphur; but, in addition, smaller quantities are contained in the form of (1) basic iron sulphates, (2) ammonium thiocyanate, and (3) unaltered sulphides of iron. The following analysis of a typical sample of spent oxide gives an idea of the relative amounts of sulphur present in the different forms.

	Per Cent.
Free sulphur	54·00
Sulphur as basic iron sulphates	1·30
Sulphur as ammonium thiocyanate	1·03
Sulphur as iron sulphides	0·64
Total sulphur	56·97

In view of the use to which the spent oxide is chiefly put—namely, that of burning to produce sulphur dioxide for the production of sulphuric acid—the most natural method of analysis would at first sight appear to be the burning of a portion of the sample in a current of air or oxygen, and the determination of the amount of sulphur dioxide produced. Methods for the analysis in this manner have been frequently proposed; but the plan has not met with general acceptance. This arises largely from the fact that in this method the sulphur present as ammonium thiocyanate, which contains over 42 p.ct. of sulphur, is included in the test; and though this sulphur dioxide is actually obtained in practice, the other products formed by the oxidation of the thiocyanate are disadvantageous in the sulphuric acid chamber, as are also the oxidation products of the tarry matter present. These result in an increased consumption of nitre in the sulphuric acid production, and otherwise tend to upset the regular working of the acid plant; and the increased sulphur due to ammonium thiocyanate is more than set off by the disadvantages in these respects. A method is therefore preferred for determining the true relative value of the spent oxide which does not include the sulphur present as thiocyanate.

Further, in large-scale practice, when the spent oxide is burnt, the residual burnt oxide always contains at least as much sulphur in the form of basic sulphate as was present in that form or as unaltered iron sulphides in the original material, so that no advantage is actually obtained from the sulphur present in these two forms. It is therefore generally agreed that, for the valuation of the spent oxide for burning purposes, the most suitable determination is one which gives only the percentage of sulphur actually present in the free state.

From the earliest times of the sale of spent oxide, therefore, the valuation of the material for sulphur content has, in the great majority of cases, been carried out by extracting the free sulphur from a weighed portion of the sample with carbon bisulphide, evaporating the latter from the solution, and weighing the residue which is taken as the amount of free sulphur present. It was very soon recognized, however, that the percentage of sulphur so found was too high, inasmuch as it includes, in addition to sulphur, tarry constituents extracted by the solvent from the tar always present in varying quantity in the spent oxide. The more tarry the sample, the larger is the extent to which the sulphur content is over-estimated; and in bad samples, such as are obtained when the gas is insufficiently freed from tar-fog before the purifiers, the amount of sulphur may be over-estimated in this way by 5 p.ct. or more. At the same time, the higher the quantity of tarry matter, the less is the value of the material to the maker of sulphuric acid, owing to the products of combustion from the organic matter increasing the consumption of nitre in the acid chambers, &c.

In spite of the above objection, this method has been the one most generally adopted down to the present time; the seller for the most part having remained content with the method—partly because the test can be carried out with simple apparatus, and he therefore thought (with very questionable justification) that anyone capable of making simple tests could make the analysis correctly, and partly because the error of the method was in the direction of giving too high results, and appeared to be in his favour. In practice, however, in the long run, the reverse is generally the case; for, in view of the fact that the test gives too high results, the buyer, to protect himself, when quoting a price per unit of sulphur in spent oxide, naturally lowers the latter in a proportion which he expects will compensate for the excessive figures for sulphur given by the test. As he cannot be sure to what extent the figures of the test will be too high, owing to the tar content varying greatly, he will also base his offer on the maximum quantity of tar likely to be present, with the result that the seller who makes a material fairly free from tar suffers in the price obtained, and the persons chiefly benefited are those who make a poor spent oxide owing to the deficiency of their tar-fog separation.

At different times methods have been proposed for the estimation of the free sulphur, excluding tarry matter; and during the past few years methods of this character have been prescribed in a number of contracts for the valuation of the material between buyer and seller. During this period we have made an examination of some of these methods, with a view to ascertaining the degree of accuracy obtainable and the possibility of making slight modifications to reduce the time required for carrying out the tests, consistently with obtaining satisfactory accuracy.

The earliest method proposed for eliminating the tarry matter from the mixed extract of sulphur and tar obtained with carbon bisulphide consisted in heating the latter with concentrated nitric acid until all the sulphur was dissolved and converted into sulphuric acid; the tarry matters remaining then for the most part insoluble on the addition of water. After filtration, the solution is precipitated with barium chloride in the usual manner, when the whole of the sulphur is weighed in the form of barium sulphate. This method gives fairly accurate results when carefully carried out; but it takes a considerable amount of time, and is in many respects an unpleasant one to the operator. On this account it has never met with any general acceptance.

Quite recently Diamond [*ante* p. 24.] has proposed a modification of this method, which consists in treating the weighed carbon bisulphide extract with small amounts of benzene; thus removing the tarry matter together with only a portion of the sulphur. After evaporating off the benzene and weighing the residue, the latter is oxidized with nitric acid and the sulphur in it estimated as barium sulphate. The difference between the weight of sulphur found and that of the total benzene extract gives the weight of tarry matter present, which is then deducted from the total weight of the carbon bisulphide extract—giving the true weight of sulphur free from tarry matter in the weight of spent oxide taken. We have not yet been able to make any detailed experiments with this method; but it does not appear to us that it is as satisfactory as other methods investigated below.

The next method proposed was that of Davis and Foucar [see "JOURNAL," Vol. CXVII., p. 673] which consists in boiling a known weight of the spent oxide with alcoholic potassium or sodium cyanide, whereby the free sulphur is all converted into the thiocyanate, the amount of which is determined by titration with decinormal silver nitrate in the usual way. As, however, the spent oxide always contains thiocyanate as well as sulphur, the amount of the former must be separately determined, and the amount of sulphur present in this form deducted from that found by the extraction with alcoholic cyanide.

This method has been checked off in several ways and found to give accurate results. But the independent determination of thiocyanate is somewhat inconvenient; and the following slight modification of the method has been found more convenient and equally accurate. In this, a weighed portion of the spent oxide is treated with carbon bisulphide and the residue of extracted

sulphur and tarry matter weighed; the thiocyanate being left in the insoluble portion of the spent oxide. The mixed sulphur and tarry matter is then boiled with an alcoholic cyanide solution, thus converting the sulphur into thiocyanate; leaving the tarry matter unattacked. The quantity of thiocyanate produced is then determined by titration with decinormal silver nitrate solution in the well-known manner.

Another method which has been proposed is to get rid of the tarry matter by treatment with concentrated sulphuric acid at 100° C., which does not affect the sulphur, but converts the tarry material partly into substances soluble in water and partly into black substances insoluble both in water and in carbon bisulphide. In the method earliest proposed, the sulphuric acid was added to the original spent oxide, and the mixture heated for some time to 100°, the product after cooling poured into water, filtered, the residue washed and dried, and then extracted with carbon bisulphide.

Our experience with this method showed that the sulphur then obtained is pure and free from tarry matter; but check tests made with mixtures containing known amounts of sulphur were not altogether satisfactory, as has also been found by Diamond [*loc. cit.*]. The modified sulphuric acid method described by Marsden [see "JOURNAL," Vol. CXXVII., p. 335] gives, however, quite satisfactory results. This consists in treating the combined extract of sulphur *plus* tarry matter obtained by extraction with carbon bisulphide with 95 p.ct. sulphuric acid at 100° for two to four hours. After heating, the mixture is poured into water, filtered and washed, and the residue and filter, after drying, again extracted with carbon bisulphide. The residue obtained on distilling off the latter now consists of sulphur free from tarry matter, and is weighed.

A further modification of the sulphuric acid methods which we have found, in many instances, advantageous and more rapid, is simply to take the carbon bisulphide solution obtained by extracting the spent oxide and shake with about 15 c.c. of 95 p.ct. sulphuric acid, which, in the course of a minute or less, effects the removal of tarry matter from the solution or converts it into insoluble substances. The mixture is then poured into water, filtered, the aqueous layer separated from the carbon bisulphide solution, which is then dried, the carbon bisulphide distilled off, and the residual pure sulphur weighed.

We have made large numbers of check tests of the methods both of spent oxide samples, and of mixtures made up of known weights of iron oxide, pure sulphur, and tarry matter, and have found that Davis and Foucar's method, as modified, and both the above-named modifications of the sulphuric acid method, all secure accurate results, as may be seen from the selection from the results of a number of tests which will be given in a later communication.

The Marsden sulphuric acid method has been adopted in recent years with satisfactory results in a number of spent oxide contracts for the valuation of the material between buyer and seller. From our investigation, it appears to us that any of the three methods named can be used for giving a correct result in terms of pure sulphur free from tarry matter.

In subsequent communications, the full details will be given of the carrying out of the three analytical methods, and also of the methods found to be most suitable for the determination of ferrocyanides, thiocyanate, and ammonia in the spent oxide.

STEAMING HORIZONTAL RETORTS.

By R. J. REW, of Exeter.

SINCE the results of what may be termed the "pioneer" efforts to bring the steaming of horizontal retorts on to some practical and permanent basis were first published nine months ago, the process has received widespread attention; and its permanent adoption under peace conditions is now assured. The idea, which was practically dormant twelve months ago, has whetted the "make-per-ton" appetite of hundreds of gas engineers, and led to the re-trial of numerous old steaming methods, many of which have been tried and failed consistently over the last 75 years.

It has been suggested that the horizontal retort is unsuitable for water-gas production, and that the main object of steam injection into it is to act as a scavenger, to displace any coal gas produced at the earliest possible moment, and so prevent the "cracking-up" process on the top side of the retort. If this were the only benefit to be derived, with horizontals the game would hardly be worth the candle; and there are even objections to it on works where liquor storage is small, and additional weaker ammoniacal liquor is a mixed blessing.

From extended trials, we find it best to steam very slightly, or not at all, during the eight-hour carbonizing period, but to steam fully for an additional forty hours. When steam is applied to the shallow depth of semi-carbonized coal or partially incandescent coke in a horizontal retort during the eight-hour period, it stands to reason that, whatever the scavenging advantages may be, the production of CO_2 must be increased enormously. The temperature of the charge is too low during the first few hours to permit the formation of a good water gas; but during the following forty-hour period nothing except ordinary blue water gas is produced, and generally speaking at the same rate per retort as coal gas—provided that the adjustment and equipment of the apparatus are correct. It is also dependent on heats and coal used, and whether a water-drip has to be adopted or steam from the boiler is available.

The make of water gas per 21 in. by 15 in. by 10 ft. retort per day has varied on different works from 3000 to 13,000 c.ft.; but the average of these figures may be considered a good output, having due regard to a moderate CO_2 content. The quantity of CO_2 produced can be kept within a 5 p.ct. average when tested on purified water gas.

To obtain this result, the coke in the retort must be kept in a complete state of incandescence during the whole forty-hour steaming period. The admission of superheated steam has but little effect on the temperature of the retort, and nothing like the rapid reduction that a charge of coal would produce. The wear and tear on the retort itself is therefore less severe; and this advantage is helped by the reduction in the amount of drawing and charging, and the total absence of carbon removal. Any reduction in temperature by the over-supply of wet steam immediately renders the make of good water gas impossible, and CO_2 is produced in such proportions that, as a dilutent, the gas added is very little better than furnace gases or air. There is a constant tendency to over-supply the steam or water; and this invariably happens in the initial attempts to adopt the process. It is difficult to get the average engineer to realize how small a quantity of either is required; and practically all past failures can be traced to one or other, or both, of these essential points.

The use of wet steam is also fatal to good water-gas production in horizontal retorts, if brought into direct contact with the incandescent coke; and some form of superheating is essential—the ideal being to bring the dry steam into contact with the incandescent coke at or about the same temperature as the coke itself. Otherwise the body of fuel is so shallow that the chemical reaction necessary to produce CO is rendered doubtful and of short duration. So important is it to obtain the highest possible temperature for the superheated steam, that the travel between the superheater and the retort must be kept as short as possible, each foot makes a large difference. Whatever may be said as to the relative advantages of dry steam or highly superheated steam for verticals, there is no doubt as to the necessity of the latter for horizontals.

Maximum time-contact is also of the highest importance; and therefore the required supply of steam should be admitted at the lowest possible pressure and speed. This assists, too, the even distribution of steam through the whole charge.

LABOUR SAVING.

The 48-hour period between the insertion and withdrawal of the charge in the steamed retorts has an important bearing on labour, which is obviously only one-sixth or one-eighth of the work necessary for the coal-gas production. Assuming that a bed of six retorts is in full work on six-hour charges, it means charging 168 retorts per week; but if two of them are steamed, it reduces the charges to 118 a week—the two steamed retorts only coming out three times per week.

THE NEW PATTERN RETORTS.

The special retorts (for which a patent is applied for) are of a form which does away with all obstruction on the inside, and gives the highest effective superheating to the steam at the right moment; and it has proved, after six months' working, to be a decided success. The insertion and withdrawal of the charge is as easily accomplished as in ordinary practice; and the existing mouthpieces and ironwork can be utilized.

The amount of water gas produced in the special retorts is also increased; and any risk of the steam short-circuiting is reduced to a minimum. Two special retorts in a setting of sixes or eights would, in most cases, give the necessary percentage of water gas. The same retorts are kept on water gas production continuously, except for the eight-hour carbonizing period every other day.

ACTUAL RESULTS.

It must be remembered that the following actual results were obtained in small gas-works, and that at least 80 p.ct. of the coal was Somerset unscreened, and about 20 p.ct. only of a very moderate South Yorkshire coal.

The average straight coal gas make for past years has been about 11,300 c.ft. per ton; but the results obtained during the four weeks in August were as follows:

Buckfastleigh. Make per Ton.	Chudleigh. Make per Ton.	Sturminster Newton. Make per Ton.
Cubic Feet.	Cubic Feet.	Cubic Feet.
15,222	14,550	14,750
15,400	13,750	15,000
15,644	14,650	14,800
15,520	14,700	14,720

If all Yorkshire coal were used, these figures could have been increased by 1000 to 2000 c.ft. per ton. At the two latter works, the change-over to the new steaming system was made direct and immediate, and not graduated or worked-up to in any way. The district conditions remained normal; nor were the air-ports of burners, &c., altered or the district pressure increased.

COAL SAVING.

Perhaps the most important result at the present time is the actual saving that has been effected on the three works during the six months June to December, 1918.

—	Buckfastleigh.	Chudleigh.	Sturminster Newton.	Total.
Make of gas . .	2,614,000	1,695,600	2,155,600	6,465,200
Coal used . .	180 tons	120 tons	155 tons	455 tons
Make per ton .	14,522	14,130	14,177	14,209 average

Basing the total combined make on the original straight coal gas rate of 11,300 c.ft. per ton, we should have had to carbonize 572 tons of coal. But 117 tons less were actually used in the six months—a 20·4 p.ct. saving.

During this six months' trial, the best results were interfered with by sickness, experiments, labour difficulties, and even stoppage of the water supply. But on shorter periods an increase of 4000 c.ft. per ton and 25 p.ct. coal saving were quite common experiences and often exceeded.

The actual saving in labour previously referred to is well worth again mentioning. At each of the three works one steamed special retort is used; and the coal retorts are usually only charged twice daily [there is no night work]. It has meant charging and drawing 312 retorts less in each little works in the six months—a big item where one man does all the stoking. It is obvious that a fully charged retort is a *sine quâ non*; and the reduction in the coke after forty hours steaming is sufficient to make its withdrawal normal.

The details as to the construction of the special retorts, the most suitable means of steam and water regulation, and the effective forms of superheaters are features of this process which are still before the patent office, and are available only to those gas companies who have come to terms with the Devon Gas Association, Ltd., of Exeter, to use the process. Many prominent gas engineers have visited the Association's works, openly sceptical that such results were possible; and the fact that 140 gas companies have decided to give the process at least a trial, is the best answer to the conclusions they have come to.

Steaming horizontal retorts has come to stay. It has lifted the small country gas-works from the 10,000 c.ft. per ton "ideal" that was riveted to the mind of the old-time gas manager. The sledge-hammer methods of the average retort-house must partly give way to the fine adjustments of the water-gas plant; and when this has been done, and the small details so essential to success have been grasped by the men in charge of it, they would as soon think of discarding the exhauster as of stopping the steaming.

SOME GOVERNMENT RESTRICTION ANOMALIES.

I.—Restrictions in Sales of Coke.

By NORTON H. HUMPHRYS.

I HAVE recently visited some half-dozen country gas-works, and been impressed by the large stocks of coke in the yards, at a time when we are told on official authority that we are passing through a period of serious coal shortage, and by the stereotyped explanation as to the cause. The small retail coke trade has practically been destroyed by the Household Fuel and Lighting Order. The whole of the items on the income side of the revenue account have now been brought under the ban of Government restriction, to the great disadvantage both of concern and consumer. The one sees profit getting smaller by degrees and beautifully less; the other has to pay more for his gas than might otherwise be necessary. In few cases have the results been beneficial to an equivalent extent, to the Government or the public in general.

The small retail trade is of special importance in these times of labour shortage, as saving handling and trimming, with its attendant breakage and the formation of unsaleable small. The ideal condition is to have customers waiting to take the coke away as fast as it is made, and the usual practice is to approach this position as closely as circumstances permit. To this end, the customer who comes in with his truck or barrow once or twice a week, and the hawker who takes a load or two per day on his donkey cart to outlying parts of the district, are of great assistance.

The allowance of three tons of coke as the equivalent of two of coal was perhaps intended to encourage the consumption of coke as a substitute, but in many instances has had a contrary effect. No intimation of this kind is given in the Order, and the figures are commonly accepted by coal merchants and others as fair estimates of the comparative fuel value in practice; and users have been led to believe that coke is out of the question unless it is offered at a price not exceeding two-thirds the current rates for coal.

Even in six small works, the stocks above mentioned amount in the aggregate to 1000 tons, which, but for the Fuel Order, would have been consumed as fuel for domestic purposes within the past four months. Have the householders who might have used it reduced their consumption of fuel to a corresponding extent? The small retail customer is not of the order who indulge in riotous or extravagant living, but belongs to a class who restrict their purchases to fit absolute needs. Some of the restrictions favour extravagance in times of peace as a safeguard against privation in times of war, as the householder having a good reserve in the form of previous wastefulness is better off under limitations based on average usage than those who, like the small customer, have no margin for economy other than actual privation.

We may assume that the 1000 tons of coke have been replaced by other fuels, of which the bulk will be raw coal. For the present purpose, we may take it that an additional 750 tons of coal will be required, which, instead of economizing, increases congestion all along the line. This quantity must first be brought to the pit bank; then loaded into (say) 75 trucks averaging 10 tons each; next conveyed by rail (say) 100 miles and unloaded on the merchant's wharf; and the trucks must be returned. Taking the journey and return, including loading and unloading, as five days, means 375 truck-days; and the train mileage is 200, equivalent to 15,000 or 20,000 ton-miles. The coal merchant must load the coal into sacks, and deliver it to his customers—say, an average mile, or 750 cart-miles on the whole. And this is not all. The gas company, being unable to sell their coke locally, will have to dispose of it to customers at a distance, which means more horse work, more truck hire, and train-mileage. And this at a time when we are strongly urged, for obvious reasons, to economize not only coal but all other resources.

The removal of the restrictions on the sale of coke would not encourage extravagance. Coke at anything between 1s. 6d. and 2s. per cwt. is not going to be wasted. And it would be a great assistance to the cause of national economy. The small retail trade at the gas-works involves no demand on the resources of the colliery, the railway company, or for horse hire, and very much less labour.

These considerations apply to a total consumption of about 12,000 tons of coal per annum. If they are looked at, in connection with the 18 million tons or so that are said to be the annual requirement for gas-works in Great Britain, which means a production approaching 10 million tons of saleable coke, their importance in a national sense will be evident. Ordinary common sense would indicate that the way to economy of coal lies in the direction of encouraging (not restricting) the supplies of available substitutes. If the 1000 tons of coke had been sold, the coal trade would have been benefited to an equivalent extent; the 1000 tons is useless to anyone, as it stands.

THE RESUMPTION OF PUBLIC LIGHTING.

By THOMAS NEWTON.

Now that the war is practically over, it is of the utmost importance that strenuous efforts should be put forth to restore normal working conditions. During the war, the curtailment, and in some cases the complete withdrawal, of public benefits, rights, and privileges were cheerfully borne by a willing community—solely with a view to the successful prosecution of the war. But the victorious termination of hostilities signalizes the desirability, as far as may be compatible with national interests, of getting rid of irksome restrictions and restraints. The restrictions imposed on public lighting during the war (subject as they were to non-technical direction and control) of necessity robbed the lighting of our thoroughfares of much of its utility. To-day, the restoration of public lighting is to the extent of 50 p.ct. of pre-war demands.

BEARING OF COAL SHORTAGE ON PUBLIC LIGHTING.

The coal shortage, of course, is responsible for the official declaration concerning the 50 p.ct. basis; but it should be borne in mind that since this official order was promulgated, many thousands of miners have been released from the colours; and other thousands are marked for early demobilization. Moreover, it was at one time thought that the Belgian coal-mining area, of which Mons is the centre, was utterly destroyed, and that consequently this would for some time cause a considerable drain on British resources. It is, however, satisfactory to know, on the authority of "The Times" special correspondent, that Mr. Lansing's stern warning to the Germans just before hostilities were suspended arrived in time to save the Belgian mines from actual destruction, and that these will soon be working again. Taking everything into consideration, therefore, there is every prospect of an immediate increase of coal output; and as soon as the coal stocks of the country warrant the resumption of public lighting on a pre-war scale, every effort should be made by all parties concerned to secure it.

BENEFICIAL EFFECTS OF ADEQUATE PUBLIC LIGHTING.

After the dreary dullness of the streets of our cities and towns during the past four years, an early restoration of public lighting, on at least a pre-war scale, would act as an immediate tonic and stimulant to the general community. Even a partial relaxation of the lighting restrictions on "Armistice Day" was hailed with delight, and contributed in no small measure to the general elation and satisfaction. It has been well said that a public lamp is sometimes as good as a policeman. Be this as it may, there is no gainsaying the fact that a lighted street lamp often secures in a surprising manner a wonderfully moral effect. The dangers which inadequate public lighting present to both pedestrian and vehicular traffic are obvious; and in view of the returning liberties of

motorists, it is specially incumbent on local governing bodies to exert what influence and pressure they can command with a view to obtaining a complete resumption of pre-war lighting at the earliest possible opportunity.

PREJUDICIAL EFFECTS OF GOVERNMENTAL RESTRICTIONS.

The inadequate public lighting, so much in evidence on every hand at present, is apt to place most undertakings in an unfair position. The lack of efficiency is very noticeable as compared with pre-war standards of lighting; and unless this is remedied in the near future, an atmosphere prejudicial to gas lighting might more easily be created than dispersed. The "man in the street," as well as the local governing authorities, might be induced, almost unconsciously, to attribute to gas lighting defects which are altogether fictitious and non-existent—simply because of certain governmental restrictions. There is real danger in the inevitable quest for economy lest the present unsatisfactory standard of lighting be stereotyped. A decision in favour of this would be calamitous, and would not fail to bring in its trail disappointment to the whole community. It has already been mooted that there has been a certain amount of "over-lighting" or excess lighting in the past, and that there is no desire or disposition to revert to pre-war standards. This is simply another way of arguing that because a community, from patriotic motives, has suffered in silence a certain amount of discomfort due entirely to the exigencies of war, it must continue to suffer discomfort which is happily now quite avoidable. It will be most unfortunate if, on account of the war, we are going to be easily satisfied with a condition of less efficiency than obtained in pre-war days.

There is another aspect of this question which deserves more than passing consideration. We are encouraged to believe that electrical competition is now under Government auspices; and this should not be overlooked. Entrancing visions are being offered to all and sundry concerning the possibilities of obtaining an electrical something for nothing. What chiefly concerns the gas industry is that no possible excuse is offered, nor a loophole made, whereby electric lighting can gain a foothold at the expense of gas. The efficiency of public lighting by gas is unquestionable; and a certain number of official restrictions have only to be removed in order that it may continue to give satisfaction in the future, as it has done in the past.

Healthy public opinion should be encouraged to insist on the resumption of public lighting on a pre-war basis as soon as the national interests warrant it; and in this it is supported by the dictates of public safety, public morality, public convenience, and the comfort and well-being of the whole community.

OVENS AND KILNS WITH A HIGH THERMAL EFFICIENCY.

At a Special Meeting of the Ceramic Society, held at Stoke-on-Trent last Thursday, a paper was read by Dr. A. BIGOT, of Paris, from which the following brief account is compiled.

The author modified a laboratory kiln by surrounding the waste pipe for gases by a sheet-iron recuperator in the form of a larger pipe; and thus increased by 200° (from 1200° to 1400° C.) the temperature of the interior of the kiln with the same consumption of gas—that is, in the same time at the same rate of burning gas. Subsequently, by surrounding the sheet-iron recuperator with insulating materials, a temperature of 1750° was reached in five hours with poor illuminating gas at a pressure of about 1·6 in. of water, and without air blast. Later, a larger kiln of rectangular section was constructed on similar lines, and was fired to 1750° C. in 5½ hours. This kiln had a working capacity of nearly 2 c.ft.; and similar kilns could be arranged with either greater or smaller capacity. Silica bricks and corindite bricks were heated in the kiln; the former being more or less deformed or even melted. This was still without increasing the consumption of fuel.

As regards industrial kilns, it is easy to adapt the same systems of recuperation and insulation to industrial intermittent kilns, whatever their mode of firing may be. These principles have been applied successfully both to kilns with movable bottoms—that is, tunnel kilns—and to those with fixed hearths.

INSULATING MATERIALS.

Insulating materials consist of minerals occurring in the form of a light powder, which can, if necessary, be agglomerated into bricks or special pieces of small apparent density. They include asbestos, light magnesia, infusorial earth, &c. A light powder of apparent density 0·2 can be made into bricks of apparent density 0·5, and with sufficient crushing strength.

The conductivity of a refractory brick at ordinary temperature is only 1 p.ct. of that of gold, that of the light powder (density 0·2) is one-tenth that of the refractory brick, and that of the insulating brick (density 0·5) is one-sixth that of the refractory brick. At 800° C., the conductivity of the insulating brick and the insulating powder is in each case six times as great as at ordinary temperatures. Above 800° C., the insulating powders tend more and more to become agglomerated, and to conduct heat better. Experiments indicate that insulators cannot with practical advantage be heated beyond 1000° C.

The mean specific heat of refractory products and of insulating products is about 0·25 up to 1000° C., the apparent density of ordinary refractory products is about 1·80, that of insulated described is 0·50 for the blocks and 0·20 for the powder respectively. To calculate the quantities of heat absorbed, it is only necessary to multiply weight by specific heat and by the Centigrade degrees rise of temperature. The quantities of heat absorbed by equal volumes will be proportional to the apparent densities; the refractory product of density 1·8 thus absorbing 3·6 times as much as the insulating brick of density 0·5, and 9 times as much as the powder of density 0·2. The use of the insulating material effects a double economy, by preventing, or seriously limiting, radiation into the air, and by increased radiation into the interior.

REFRACTORY MATERIALS FOR TUNNEL KILNS OR OVENS.

Wagons for tunnel kilns have hitherto moved on wheels or on metal rollers, cooled to avoid corrosion. Such wagons are cumbersome, cause considerable loss of heat, and necessitate larger tunnels. The author supports the material to be fired on plates moving over a system of balls which roll on a fixed floor; the whole being made of refractory materials possessing three chief properties—viz.: (1) Resistance to wear and tear at both high and low temperatures; (2) crushing strength at various temperatures; (3) ability to withstand changes of temperature. If these three qualities are not combined the practical employment of these wagons is found impossible. The materials employed by the author for the rolling resist deformation up to 1100° C. In tunnel kilns, for temperatures up to but not exceeding 1100° C., the rolling system is taken to the same temperature as the goods which it supports, and its volume is reduced to the minimum; such kilns being named tube kilns by the author.

For temperatures above 1100° C. the balls are at a greater distance below the goods (about 1 foot below for a temperature of 1550° C.). Such kilns are called tunnel kilns. Since these kilns, completely surrounded by insulators, lose very little heat, either to the air or into the ground, they may be made smaller and can be adapted for firing small lots; whereas previous tunnel kilns can only be used economically for firing large quantities.

KILNS WITH MOVABLE BOTTOMS.

Kilns with movable bottoms, including tube kilns and tunnel kilns, require five principal parts: (*a*) The rigid covering. (*b*) The bottom of the kiln. (*c*) The tube or tunnel. (*d*) The movable parts and the rolling way. (*e*) The insulating covering.

(*a*) *Rigid Covering.*—This consists of a body of ferroconcrete; certain spaces being filled up with ordinary bricks. A long, rigid, but light chamber is obtained.

(*b*) *Bottom of the Kiln.*—The lower part of the chamber is filled up to a suitable height with insulating concrete resting on the ground. On this concrete one or two ranges of insulating bricks are laid out, placed flat with insulating grout. The surface of the bricks should be as plane as possible; and it is on this surface that the other three parts of the kiln are established.

(*c*) *Tube and Tunnel.*—These are composed of two vertical brick walls terminated above by a brick arch or by large curved slabs forming a roof. The material and form of bricks or slabs vary according to the temperature required. The interior of the tube kiln is provided from end to end with hollow refractory materials, which are as highly conducting as possible. Combustion takes place in these passages, into which air is introduced, and from which gases pass away.

(*d*) *Movable Part and Rolling Way.*—The lower part of the tube and tunnel is provided with special refractory slabs (of variable dimensions and shapes) made of the same material as the balls and the movable plates; and on these the balls lie. In the tunnel kiln, the movable wagon is provided with a refractory chamber covered with plates which carry the materials to be fired.

By a special arrangement the fired products in a tunnel kiln can be cooled pretty rapidly, and the greater portion of their heat recovered. This permits the shortening, by one-half, of the length of the tunnel kiln between the fireplaces and the discharging place for the wagons. For a normal tunnel kiln, a length of 54 yards is recommended, as giving the highest thermal efficiency.

It is claimed that a tunnel kiln, fired to 1250°, utilizes 78 p.ct., and at 1450° 70 p.ct. of the heat obtainable from the fuel, or more than 85 p.ct. if the kiln be made long enough.

Materials which have been successfully fired in these tunnel kilns include (at 1450° C.) porcelain insulators, cements, bauxite products, corindite, and chromite, with a fuel consumption of 75 kilos. to the ton; and at 1530° C., magnesia products, with a consumption of 105 kilos of fuel, also silica bricks with 130 kilos per ton.

To sum up, these new kilns are simple, not very costly, and require little manual labour.

The reading of the paper was followed by a rather lively discussion; and among the points criticized were the consumption of fuel in cases where the firing periods might be longer than thos specified, the normal life and behaviour in use of the movable bottom with refractory balls, &c., the dimensions of the tunnel kilns, the nature of the special cooling arrangements, and the short time apparently taken to fire silica bricks. Further information was requested on these and some other matters. The regrettable absence of the author prevented the immediate answering of the questions raised; but they will be submitted to him in due course.

DUTCH ASSOCIATION OF GAS ENGINEERS.

Annual General Meeting.

(*Continued from p.* 26.)

OLD AND NEW METHODS OF PRODUCING AMMONIA.

Prof. Steger divided his lecture on this subject into four sections—viz.: (1) Coal and atmospheric nitrogen as sources of ammonia production. (2) Influence of distillation on the yield of ammonia. (3) Haber's synthesis of ammonia. (4) Manufacture of ammonia from nitrolime (cyanamide).

He referred to an address which he gave to the Association the previous year, in which he suggested that the gas industry should develop in future on lines somewhat akin to those which the members had this year, of necessity, been forced to adopt. The development in the immediate future depended on the manner in which the general position unravelled. He was, however, for various reasons, still a little bit sceptical as to whether the gas managers of to-day would become the industrial chemists of the future. It was, however, in any case desirable that gas managers who produced ammonia should be well acquainted with the latest developments in the manufacture of ammonia; but it would be possible for him only to review very briefly the more modern methods of manufacture—viz., Haber's and the cyanamide processes.

Regarding the production and yield of ammonia by the distillation of coal on gas-works, the first question was whether the ammonia obtained was already present in the coal as such. This was a broad question to which it was difficult to give an answer; but some light might be thrown upon it by the following considerations: Coal is of vegetable origin, and cellulose, which is the basis of plants, contains no nitrogen, and cannot therefore be a direct source of ammonia. All plants, however, contain albumen, and all albumens, whatever their class or their order, contain nitrogen, and it is doubtless the albumen of the plants which is the original source of the ammonia. The nitrogen occurs in albumen in the amido grouping—*i.e.*, on the one side it is in combination with the albumen molecule, and on the other side with two hydrogen atoms. But while the ammonia is already present, as to two-thirds, in the original albumen, albumen itself no longer remains in the coal. In common with the other organic constituents of plants, it has doubtless undergone change in their transformation into coal. Proof that the nitrogen in coal is in the amido form is not afforded by reference to its origin; but other considerations point to a strong probability it is so.

Undoubtedly the nitrogen should be recovered from coal as ammonia; but the yield of the latter depends largely on the way in which the coal is distilled. In horizontal retorts, the yield is lowest, corresponding on the average to a recovery as ammonia of 17 p.ct. of the nitrogen in the coal; while in the Mond type of producers, it is highest—corresponding to 60 to 70 p.ct. of the nitrogen in the coal. Between these comes the yield in vertical retorts and ovens. Thus while it seems possible to increase by appropriate steps the yield of ammonia nearly to that which corresponds with the nitrogen present, exactly what takes place in the retort or oven, between the elements nitrogen and hydrogen is so far outside our powers of observation. But everything points to the probability that the ammonia formed on gas-works comes from the amido grouping, and is therefore two-thirds formed in the coal itself.

Care has to be taken, however, not to dissociate the ammonia again into its elements, hydrogen and nitrogen. Generally speaking, on gas-works, part (10 to 17 p.ct.) of the nitrogen of the coal is recovered as ammonia; a smaller part (0·8 to 1·8 p.ct.) as cyanogen; the greater part (35 to 75 p.ct.) remains in the coke; there is a small part (1 to 2 p.ct.) condensed with the tar, and the balance (12 to 50 p.ct.) passes into the gas as free nitrogen. It is evident that the ammonia initially formed does not escape decomposition; but at the temperature, and in the other conditions prevailing in the retort, it is dissociated partly into hydrogen and nitrogen. The latter, *in statu nascendi*, forms, with carbon, cyanogen or hydrocyanic acid, which become impurities in the gas, or nitride, which remains in the coke and is only gasified on complete combustion. The nitrogen in the tar is in the form of cyclic compounds, such as pyridine and chinoline.

The higher the temperature of carbonization, the more ammonia is dissociated, and the more cyanogen is formed. This is due to the heat of formation of ammonia being positive (+ 12, cals. per atom of nitrogen), while that of cyanogen and hydrocyanic acid is negative (— 37 and — 30·5 cals.). The temperature required for the ready formation of ammonia is generally assumed to be 800° C.; while at only 100° higher—viz., 900° C.—its dissociation becomes very marked, and the formation of cyanagen compounds increases. As a consequence of the foregoing facts, it happens that with the horizontal retort, in which the ammonia has rather intimate and prolonged contact with the walls, the ammonia yield is somewhat small, averaging about 18 lbs. of sulphate per ton of coal, which corresponds with about 3·8 lbs. of nitrogsn. If coal contains 1 p.ct. of nitrogen, the yield of ammonia is equal to about 17 p.ct. of the nitrogen in the coal, and the gas-works in Holland should in normal times produce about 18,000 tons of sulphate per annum.

Attempts have been made as long as forty years ago to increase the yield of ammonia by adding lime to the coal; the intention being to expel the ammonia by the stronger base (lime), as is done in some chemical operations. In 1883, R. Tervet proposed to pass hydrogen through the retort in which the coal was being distilled, and later Vivian B. Lewes led uncarburetted water-gas through. But both ideas have been given up. A third procedure has had better success—viz., the reduction of the temperature of distillation by the presence of steam resulting from moist coal, and the shortening of the time of contact of the gas with the hot walls of the retort by completely filling the retorts with coal. The yield of ammonia may thereby be increased by 100 p.ct.

A still greater effect on the yield of ammonia may be secured by blowing an excess of steam through the fuel, as in the Mond producers, whereby 72 p.ct. of the nitrogen of the coal may be recovered as ammonia; and similar yields may be obtained in the same way in the gasification of lignite and peat.

These experiences indicate the direction in which an increased yield of ammonia may be looked for. With vertical retorts, it is probable that a definite result would be attained by introducing steam into the retort in the first half of the carbonizing period, when the gas is most freely evolved and the production of ammonia is highest, instead of following the present practice of steaming for two hours after distillation is almost finished. The author is not aware that this suggestion has been tried; but trials of it could be made with little trouble at the Southern Gas Works at Amsterdam.

Passing on to the modern synthetic methods of obtaining ammonia, the author pointed out that, owing to the heat developed in the combination of nitrogen and hydrogen, it was necessary to effect this combination at low temperatures, at which, however, there was the disadvantage that the rate of formation was too slow to be of industrial utility. There were two means of accelerating the reaction—viz.: (1) By the use of a catalyst, and (2) by increasing the pressure. As regards the first, catalysts such as osmium, uranium, and iron in a state of fine division effected a rapid formation of ammonia at 500° C., at which temperature otherwise scarcely any formation would take place. As regards the second, reactions which involve a diminution of volume (in this case by half—*i.e.*, 1 volume of nitrogen and 3 volumes of hydrogen yield 2 volumes of ammonia measured at the same temperature and pressure) are accelerated by increasing the pressure. Thus in the practical synthesis according to Haber's process, using iron with a little lime as catalyst at a temperature of 600° C., and a pressure of 200 atmospheres, a maximum yield of ammonia of 8·4 p.ct. by volume of the hydrogen and nitrogen passing through the converter is attainable. The unconverted gases leaving it are made up to the former volume with fresh gases and are re-circulated through the converters. The Baden Aniline and Soda Works worked out the necessary apparatus for the continuous operation of this process, and before the war established a works at Oppau, which in 1913 was putting on the market 25 p.ct. sulphate at a cost of £45 3s. per ton of real ammonia. The nitrogen cost £1 5s., the hydrogen £9 8s. per ton of ammonia; while the cost of production of sulphate of ammonia from this synthetic ammonia was only £2 7s. 3d. a ton.

The author then proceeds to describe methods for obtaining nitrogen and hydrogen for use in the Haber synthesis of ammonia. Nitrogen is obtained from the air by removal of the oxygen, either by copper turnings, which, when so converted to oxide, are reduced by water gas for use again, or by fractional distillation of liquefied air. By the latter process, nitrogen of 99·6 to 99·8 p.ct. degree of purity is obtainable for a power expenditure of 11·3 units of current per 1000 c.ft. Hydrogen is obtained either from the electrolysis of water (which is too costly a method unless current is extremely cheap, but has the advantage of yielding a pure gas) or by the Messerschmidt steam-iron process, or by the fractional distillation of liquefied water gas.

The second means of manufacturing ammonia synthetically is through calcium carbide, which at about 1000° C., takes up nitrogen, with the formation of calcium cyanamide or nitrolim. The latter is itself available as a fertilizer, as it contains 18 to 20 p.ct. of nitrogen in a form in which plants can assimilate it as readily as from sulphate of ammonia. Bacteria in the soil have the power of converting cyanamide and water into ammonia, and the same conversion is effected industrially by passing steam at six atmospheres pressure over calcium cyanamide, whereby ammonia, calcium carbonate, and graphitic carbon result.

Sir Charles L. Parsons, in a report in 1917 to the United States War Office and Naval Departments on the relative merits of the Haber and calcium cyanamide methods of synthetizing ammonia, stated that the Haber process was decidedly the cheaper. With current at about £1 13s. 4d. per kilowatt year, ammonia by the cyanamide process would cost £2 2s. 6d. to £4 5s. more per ton than by the Haber process. From this it appears that the cyanamide process has not the technical importance of the Haber process. In the author's opinion, it is still the duty of the gas engineer to develop the home production of ammonia by recovering as much as is possible of the nitrogen of coal in that form.

DISCUSSION ON PROF. STEGER'S LECTURE.

The Chairman (Dr. Terneden, of Amsterdam) said that trials had actually been made with the vertical retorts at the Southern Gas-Works somewhat on the lines suggested by Prof. Steger. Observations were made of the yield of ammonia when the temperature of the vertical retorts was varied; and it was found that a tolerably low temperature gave the maximum yield of ammonia. Attempts were then made to prolong the time of low temperature

distillation by retarding the regular rise by admitting steam about the fourth or fifth hour after charging. The result was that the yield of ammonia increased enormously. Compared with about 24½ to 27 lbs. of sulphate per ton of coal in ordinary practice, the yield rose in these trials to 33½ to 36 lbs. per ton. Owing to the difficult conditions of the times, and the changing descriptions of coal available, the trials did not prove with certainty whether the procedure followed had any effect on the gas. The effect, if any, was not great; but the only figure ascertained with certainty was the yield of ammonia.

No other member having risen to discuss the lecture, the Chairman expressed the hearty thanks of the meeting to Prof. Steger.

ELECTION OF PRESIDENT AND COUNCIL.

The CHAIRMAN then called upon the Chairman of the Scrutineers to announce the results of the voting for the election of President and new members of Council for the year 1919, which were as follows: President: Heer M. C. Sissingh, the Manager of the Rotterdam Gas-Works. Members of Council: Heeren H. de Liefde (Culemborg), in succession to, and for the unexpired term of office of, the late Heer van Rossum du Chattel, M. Levert (Apeldoorn), J. Rutten (the Hague), and D. A. Payens (Groningen). Member of the Coal Committee: Dr. L. J. Terneden (Amsterdam). Member of the Benevolent Fund Committee: Heer S. H. Bonthuis (Goes).

It was subsequently announced that the general meeting in 1919 would be held at Maastricht, where members would be afforded an opportunity of visiting the Limburg coal fields, which have recently been opened up and have proved invaluable to Holland during the last few years of greatly restricted imports of coal.

Technical proceedings were resumed with the reading of a paper by Dr. F. van Oostrom Meyjes on "The Prescriptions for the Testing of Coal Tar issued by the State Coal Department."

(*To be continued.*)

ESTIMATION OF CYANOGEN COMPOUNDS IN CONCENTRATED AMMONIA LIQUOR.

Of the three papers submitted on Monday of last week, at a meeting of the London Section of the Society of Chemical Industry, one was by Dr. Percy E. Spielmann, B.Sc., F.I.C., and Mr. Henry Wood, and was entitled the "Estimation of Cyanogen Compounds in Concentrated Ammonia Liquor." Dr. Spielmann, who presented the paper, said that he was sorry to have been unable to read it at the last meeting, so that it might have been discussed along with the valuable contribution by Dr. Colman and Mr. Yeoman. [See "JOURNAL" for Dec. 10, p. 567.]

It was pointed out in the paper that the methods of estimation of cyanogen compounds in crude gas liquor have been either worked out or re-examined most carefully by Mr. Linder; but they are not immediately suitable for concentrated ammonia liquor—partly because of the large percentage of ammonia present, but particularly on account of the occasional smallness in quantity of one or other of the cyanogen impurities. Determinations of considerable accuracy can, however, very simply be made by a calorimetric method, by employing a Lovibond tintometer. The basis of the scheme of analysis advocated is: Conversion of the ammonium thiocyanate into ferric thiocyanate, and measurement of the depth of colour obtained. (2) Interaction of a further quantity of the original liquid with ammonium polysulphide, whereby the ammonium cyanide originally present is converted into ammonium thiocyanate, and the estimation of the total ammonium thiocyanate as ferrtc thiocyanate. The increased quantity found over and above that found directly (without polysulphide treatment) is a measure of the quantity of cyanide originally present. The presence of ferrocyanide compounds causes no complication, as the conversion by the polysulphide solution of any proportion of the ferrocyanide into thiocyanate can be avoided. The authors then proceeded to detail the procedure recommended, which was arrived at after a considerable number of experiments and trials on known mixtures and on commercial samples. Different procedures are recommended for the estimation of thiocyanate and cyanide when ferrocyanide is and is not absent, because of the necessity there is to avoid heating when ferrocyanide and polysulphide are in the presence of one another, or when the cyanide may react (undesired) with polysulphide.

In 1917, Mr. Linder described how polysulphide in a sample of concentrated ammonia liquor can be estimated by its reaction with excess of cyanide, to form an equivalent quantity of thiocyanate. The determination of this can obviously be made by means of the tintometer, when the procedure would be: (1) Determination of thiocyanate as such. (2) Addition of excess of cyanide solution, and boiling. In this case, reaction of existing cyanide and ferrocyanide is of no consequence, as the final result is the conversion of polysulphide into thiocyanate. The difference between the two results is the measure of polysulphide in terms of thiocyanate.

The authors described the method of employment of the Lovibond tintometer, which was found to be a very suitable instrument for the purpose. The source of light (a half-watt lamp) was standardized on a solution of potassium dichromate, saturated at 20° C., in order that their work and all other with colours of the same order can be referred to a definite standard. A lamp with frosted glass is preferable to a plain glass bulb, shielded with tissue paper. If the liquid is intrinsically brighter than the colour glasses, this should be lowered by means of neutral tint, after which matching of colour is more reliable.

DISCUSSION.

Dr. HAROLD G. COLMAN said he had not been altogether pleased at his attempts with colorimetric methods, which did not agree very well with the check tests. He had not, however, used the tintometer. He would like to ask Dr. Spielmann whether the peculiar coloration which always occurred with concentrated liquors, due to the action of ferric salt on the phenols, interfered with the test. With the check test, also, did they have sulphuretted hydrogen present or not, because if they were determining cyanides it made all the difference whether or not there was sulphuretted hydrogen? With sulphuretted hydrogen present, the cyanide figures always came low.

Mr. ARNOLD PHILIP said he would like to be enlightened as to why it was that such small amounts of cyanogen compounds were of so much importance—as no doubt they were. They had now had two papers on the methods of their estimation.

Dr. SPIELMANN replied that they did not take into consideration the question of phenols in connection with the check tests. In the early part of the research, the examination of commercial samples was followed very carefully with the older and longer methods; and there were no discrepancies found. This was, perhaps, an indirect reply to Dr. Colman's query. As to why these minute quantities of cyanides were important from the point of view of the laboratory he had been been directing, they were important because the ammoniacal liquor was destined for the manufacture of ammonium nitrate, and cyanide impurities were found to act with extraordinary unpleasantness when mixed with explosives and filled into shells. For this reason, these impurities should be cut-down to the lowest possible limit; and the various liquors had to be reported upon for these small quantities.

The CHAIRMAN (Dr. C. A. Keane) said he was sure those present wished him to convey to Dr. Spielmann and Mr. Wood sincere thanks for this contribution, which formed a very admirable supplement to the paper they had had from Dr. Colman and Mr. Yeoman.

Newspapers as Gas Consumers.

In an article appearing in the "Gas Record," of Chicago, on the large use of gas, when properly equipped, by newspapers, Mr. Gilbert C. Shadwell, after describing the types of melting-pots employed, says it must be remembered that there is a difference between the various classes of soft metal which will make some variation in the time required to melt them down. The following data are given to show how approximate figures may be determined, and what gain in speed may be expected from blast-burners. They do not apply to aluminium, but to merely an average of soft metals of the character of linotype metal. Linotype metal is composed approximately of 85 p.ct. lead, 12 p.ct. antimony, and 3 p.ct. tin; the melting-point being about 525° Fahr. The pot of the 1000 lb. furnace will contain, when full, between 350 and 400 lbs. of ordinary linotype slugs; and this charge may be melted, and the operation of pouring begun, in less than 30 minutes after lighting the furnace, with an atmospheric burner. Such a furnace will melt from 5 to 6 lbs. of metal per cubic foot of gas consumed (with an atmospheric burner); and therefore 100 c.ft. of gas will melt from 500 to 600 lbs. of metal. If the burner has a capacity of 150 c.ft. of gas per hour, 500 lbs. of metal can be melted in from 35 to 40 minutes. Again, 1000 lbs. of metal can be kept melted with approximately 45 c.ft. of gas per hour with this type of burner; but, of course, the amount varies according to the composition of the metal and the kind of gas used. If the furnace is equipped with an economical fan-blast burner, with a capacity of 200 c.ft. per hour, the 500 lbs. of metal may be melted in from 20 to 25 minutes; and by burning gas at a higher rate, the metal may be melted even faster.

Waste Gas-Works Heat for Baths.—The "Journal für Gasbeleuchtung" says recent statistics for a town of 20,000 inhabitants show that an average of two visits to the washing baths and three visits to the swimming baths were made in the year per head of the population. Warm water possesses important advantages over steam in that it is more suitable for the storage of heat, and suffers much less loss of heat in transmission. It may be led a distance of several kilometres with a loss of only about 2 p.ct. per kilometre. When the baths are situate near the gas-works, the loss of heat in transmission may be made negligible; and the cost of pipes in such circumstances is not great.

Benzol for Commercial Motors.—The National Council of the Commercial Motor Users' Association (Incorporated) has decided to issue a list of suppliers of benzol for use in motor vehicles uniform with the list of gas-filling stations compiled by them. In order that this list may be as complete as possible, suppliers of benzol motor spirit who are desirous that their names should be included are requested to send the following information to Captain F. G. Bristow, the General Secretary of the Commercial Motor Users' Association, No. 83, Pall Mall, S.W. 1: (1) Name of firm, full address of depôt, and hours during which supplies of benzol may be obtained; (2) price—(*a*) in tins, (*b*) in barrels or drums, (*c*) in tank-wagons; (3) any special conditions that appertain as to distribution.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Housing Schemes and Minimum Storage for Water-Heating Apparatus.

SIR,—In connection with the numerous national and local housing schemes that are going to be so general for some considerable time, we can foresee that there will be difficulty in a number of districts, where the local water authority has in existence a regulation fixing the minimum storage capacity of the water-heating apparatus in a house at some figure which is quite too high for the small class of house of which so many are going to be built. For example, in one large city the minimum is 30 gallons, whereas a 12-gallon storage is more like the maximum that would be possible in a great many of the houses to be erected.

You will readily appreciate that this would mean quite a prohibitive regulation, so far as the installing of water-heating apparatus in this class of house is concerned—a state of things neither desirable in the interests of the eventual residents of the houses, nor in those of the gas industry, which hopes to find a wide field for this water-heating apparatus in the new housing schemes. Such regulations have doubtless had some good cause at the time they were established a number of years ago; but we think you will feel with us that the new conditions call for revision of such rules.

JOHN WRIGHT & CO.

Essex Works, Birmingham, Jan. 10, 1919.

Assessments of Gas Undertakings.

SIR,—The large increase in rates, as disclosed by the statement of the Borough Treasurer of Preston published in your last issue, can occasion no surprise in view of the special conditions prevailing. But in connection with the general question of rating, there is one aspect—viz., the fixing of assessments—which affects gas undertakings, and more particularly sliding-scale gas companies, which appears to have been overlooked by our industry. The following extract from the "Parochial Assessments Act" is so well known as to scarcely need quotation:

> "No rate for the relief of the poor in England and Wales shall be allowed by any justices, or be of any force, which shall not be made upon an estimate of the net annual value of the several hereditaments rated thereunto—that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of all usual tenants' rates and taxes and tithe commutation rent charge (if any), and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses (if any) necessary to maintain them in a state to command such rent."

In prosperous times this definition made for higher assessments; and local authorities have reaped the full benefit of such. It is not arguing pedantically to say that, now that conditions are reversed, with higher prices for gas, reduced profits, and uncertainty as to the future, the "rent" obtainable for any undertaking would not be so high as before the war, and as a consequence assessments should show a reduction. It would be interesting to know if any reduction in assessments has been obtained as a result of recent trading conditions.

SECRETARY-ACCOUNTANT.

Jan 11, 1919.

P.S.—Incidentally, the point furnishes another side-light on the effects of the sliding-scale.

Some Interesting Points in Relation to Cooking by Gas or Electricity.

SIR,—Through the kindness of the Bournemouth Gas Company in lending me several copies of your valuable "JOURNAL," I have had the pleasure of studying the recent interesting tests made in relation to cooking by internally heated gas-cookers and electricity, so ably reported and commented upon in your issue of Dec. 10. I understand that the main points at issue are:

1.—Which is the most hygienic method of cooking?
2.—Which is the most economical in fuel?
3.—Which presents the least wastage, or, in other words, gives the heaviest joint when cooked?

In respect of No. 1, we are told by the gas companies that an internally heated gas-cooker is quite hygienic, when regulated properly in respect of its gas and air supply. This point we take to be correct. It is, however, a most vital point that it should be hygienic under all conditions affecting the fuel supply. In any further tests, an externally heated oven ought to be tested—especially so, seeing that electricity would be thereby disarmed of one of its chief claims. I am not sure, also, as to whether it would not score also on account of wastage.

On No. 2 point no comment is necessary.

On No. 3 point, however, I would like to draw attention to an important fact that seems to have been overlooked. I am given to understand by the electricians themselves that an electric oven is an absolutely sealed compartment—no vent whatever being provided for the carrying-off of the steam or vapour arising from the joint in process of being cooked. It might almost, therefore, be said to be a combined process of baking and steaming; and the preventing of the vapour from the joint escaping, as it would do in an oven with a vent or flue, would possibly account for the joint being somewhat heavier when cooked. If this is so, then it simply means this—that the joint electrically cooked contains a certain percentage more moisture than the one cooked in the dry heat of an internally heated gas-oven properly vented. It certainly would appear, judging from the note by Miss Thorpe *re* nutritious juices in the dripping, that one might go so far as to suggest that there is a greater wastage of nutritious juices in electrically cooked joints; and in place thereof one gets substituted a considerable amount of non-nutritious moisture. It would be most interesting to have expert opinion on this aspect, and also which atmosphere is considered best in which to cook joints, bread, or pastry—*i.e.*, a dry heat which is being constantly changed or renewed as in a gas-oven, or a moist stagnant heat as in an electric sealed oven.

Another point is, Which method of cooking makes the meat the most digestible and appetizing? I am just wondering what our electrical friends will have to say in reference to these several points.

Perhaps it might be interesting to many of your readers if I mention that, after most carefully studying the problem of providing a thoroughly efficient and economical gas-oven heated externally in order to meet the claims of our opponents, I feel I am entitled to say that I have succeeded. Unfortunately, however, being in England I am (like most inventors) at the mercy of "the slow to-morrow will do" English manufacturer; and, therefore, until I can find one a little keener than his fellows, and prepared to take the matter in hand and build an oven up, I fear I must let it slide. I have also designed a new gas-fire for sick-rooms, the object of which is to enable water, &c., to be heated without the products of combustion escaping into the room. I am, however, in the same position with this as well.

A. GOSDEN.

Thornhill Dene, Sandecotes Road, Parkstone, Dorset, Jan. 9, 1919.

[With water vapour as a product of combustion of gas and with the moisture from the joint being cooked, "dry heat" is perhaps hardly the correct descriptive condition of the inside of an internally heated gas-oven, though the atmosphere of the oven is not super-saturated as is the case in the electric-oven.—ED. G.J.]

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Dec. 31.]

Nos. 21,472—21,933.

ABRAHAMS, E. G.—"Generation of producer gas." No. 21,539.
BAINES, J. R.—"Device for repairing leakages in pipes, &c." No. 21,877.
BAMBER, H. W.—See Abrahams. No. 21,539.
BROWN, H. E.—"Apparatus for reception and delivery of gas, oil, &c." No. 21,669.
BRUNNSECHWEILER, K. A.—"Gas or oil stoves." No. 21,690.
CHRISTOPHER, J. E.—"Method of distillation, carbonization, or gasification of coal, carbonaceous material, oil shales, &c." No. 21,724.
ELY, C.—"Rotary pumps and compressors." No. 21,492.
GREGSON, W.—"Gas-fired oven or muffle furnaces." No. 21,596.
HEWITT CONSTRUCTION SYNDICATE.—"Appliances for steaming gas-retorts." No. 21,637.
KING, TAUDEVIN, AND GREGSON.—See Gregson. No. 21,596.
LATHAM, C.—"Reciprocating conveyors for coal, &c." No. 21,858.
LIDVALL, N. A. F.—"Water-heater for gas-stoves, &c." No. 21,843.
LIGHT, G.—"Regulators for gas-burners." No. 21,902.
M'MURDO, A. H.—"Device for regulating flow of gas for illuminating." No. 21,832.
WHITCHER, A. E.—See Hewitt. No. 21,637.

[Extracted from the "Official Journal" for Jan. 8.]

Nos. 1—295.

BALLINGALL, J. M.—"Apparatus for manufacture of hydrogen." No. 195.
BATEMAN, H.—"Apparatus to prevent and arrest passage of heat rays between any source of light and the object illuminated." No. 86.
BENNETT, E. M.—"Reflecting lamp shades and globes." No. 151.
BLAZERE, F.—"Safety cocks for gas-apparatus." No. 281.
BROADHEAD, C. F.—"Manufacture of gas." No. 55.
COUSANS, L. B.—"Burner cleaners." No. 247.
CRAVEN, H.—"Mechanical means or apparatus for conveying coal, &c." No. 173.
DEMPSTER, R. & J.—See Ballingall. No. 195.
FLORENCE, A. P. "Gas, &c., cookers." No. 294.
MARTIN, F. P.—"Volumetric meters for liquids." No. 295.
MITCHELL, F. G.—"Supporting and guiding means for endless-band, &c., conveyors." No. 235.
PLAYER, E.—"Crucible, &c., furnaces heated by gas." No. 192.
SILVESTER, N.—See Blazere. No. 281.
SMITH, V. D.—"Gas igniter for domestic use." No. 268.
STERLING METALS, LTD.—See Player. No. 192.
SWINBURNE, J.—"Low-temperature destructive distillation." No. 261.
WHITAKER, T.—"System of low-temperature carbonization." No. 257.
YEADON, J. A.—"Coal conveyor." No. 90.
YEADON, J. A.—See Whitaker. No. 257.

Stockport Gas Undertaking.—Reference was made in our issue of Dec. 17 to a special meeting of the Stockport Trades and Labour Council, at which a strong protest was made against the recent increase in the price of gas, and a Local Government Board inquiry was demanded. Presumably as a result of this meeting, it is now announced that an expert is to be appointed to investigate and report upon the working of the Stockport gas undertaking. Owing to the heavy losses on the concern, the price of gas has been increased by 9d. per 1000 c.ft.—bringing the charge up to 5s.; and there will, it is said, still be a heavy deficit at the end of March. The losses are stated to be due to the increase of wages and bonus, the great increase in the price of coal, the shortage of labour, and the reduced consumption of gas owing to the operation of the Fuel and Lighting Order.

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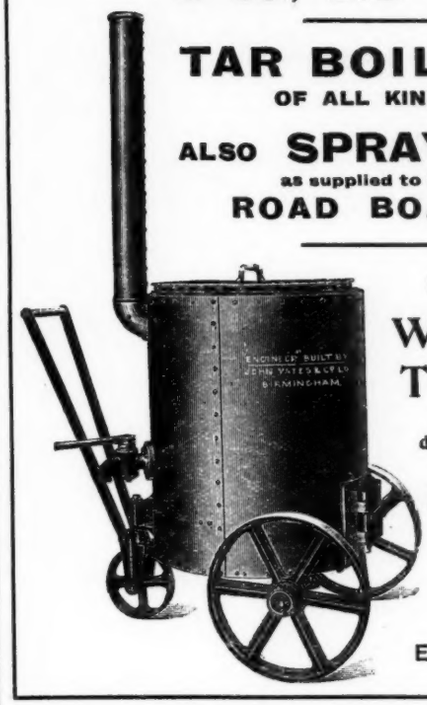

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MISCELLANEOUS NEWS.

MANCHESTER GAS-WORKS EXTENSIONS.

A £250,000 Scheme.

As foreshadowed in the "JOURNAL" last week, the Manchester City Council, at their meeting last Wednesday, had before them for consideration the questions of the proposed extensions to the plant at the Bradford Road Gas-Works, and the appointment of Mr. William Newbigging as Consulting Engineer. These matters were the subject of recommendations of the Gas Committee.

Alderman KAY, the Chairman of the Gas Committee, pointed out that for some time they had not been able to provide an unrestricted supply of gas, and it was absolutely essential that extensions should take place. It was necessary at once to enter upon a considerable extension of the Bradford Road works, involving the expenditure of something like a quarter of a million of money. Manchester could not wait any longer. For the last six years they had not been able to give the supply that the public had a right to expect. At the time of the death of Mr. J. G. Newbigging, late Gas Engineer, they had a scheme of extension under consideration. This scheme had now been reported on by Mr. William Newbigging. He moved that Mr. Newbigging should act as Consulting Engineer, so far as the existing plant of the gas undertaking was concerned, at a remuneration at the rate of £1250 per annum, and that the Council be further recommended to appoint Mr. Newbigging as Consulting and Supervising Engineer in connection with the proposed extensions to the carbonizing plant, &c., at the Bradford Road Gas-Works—he to provide all the necessary services connected with the preparation of plans, &c., in consideration of a remuneration at the rate of 2 p.ct. on the contract amount of the work. The report of Mr. Newbigging on the extension scheme was an illuminating one, though he was afraid that this could not be said of Manchester gas at present. Some day they would have to face the prospect of erecting an entirely new works on a site that had not yet been determined upon.

The resolution was carried after a short discussion; and the Gas Committee's minutes were approved of.

THE BUENOS AYRES GAS SCANDAL.

It is stated in "The Times" that the latest development of the Buenos Ayres gas dispute [*ante*, p. 35] is the news that the gas account due from the Municipality of Buenos Ayres to the Primitiva Gas Company for the months of January and February of last year has been "liquidated" by the Municipality in the following manner: Amount of account for public lighting, $233,000; less deductions made by Municipality of unauthorized taxes, $87,000; and gas tax (being 10 p.ct. of the gross receipts of gas sold to the public), $204,000; leaving only $29,000 for the Gas Company to collect under protest. "It seems," is the comment made, "extraordinary that a British Company should have such treatment meted out to it by an unfriendly Municipality."

GAS ADMINISTRATION AT WEXFORD.

Extraordinary General Meeting of the Company.

An Extraordinary General Meeting of shareholders of the Wexford Gas Consumers' Company was held at the Offices last Thursday week, in pursuance of a requisition signed by eighteen shareholders in the following terms: "We hereby requisition you to convene an extraordinary general meeting of the Company for the purpose of having the existing Directors, or one, or more of them, as may be deemed advisable, removed from office, and new Directors, or a new Director, appointed in the stead of the Directors or Director so removed." Mr. J. E. BARRY (the Chairman) presided.

The Directors in convening the requisitioned meeting issued the following statement: "The Directors are not aware that any action of theirs has in any way injured the shareholders, consumers, or the Wexford public; and therefore they fail to see any cause or justice in any of the shareholders taking such a drastic step as voting for the removal of the Directors, or any one of them. It is evident, though not stated in the requisition, that the object of the signatories is to question the orders of the Board in reference to Mr. Alfred Lyne. As expressed in a previous circular, the Directors showed every consideration to Mr. Lyne, the late Manager; but his action rendered his retention absolutely impossible. He refused to carry out the orders of the Directors to re-open the works when an agreement was come to with the men, twice stating that he absolutely refused to re-open; and subsequently he took the initiative himself by saying he would resign, and would not go back on the terms agreed. Afterwards he did resign; and the Directors accepted his resignation. The Directors then gave him every opportunity of being re-instated, the history of which has already been placed before you in the reply to the memorial sent in by some of the shareholders. The Directors had no alternative but to appoint Mr. P. J. M'Evoy, of Midleton. Mr. M'Evoy has very strong testimonials from past employers; and the Directors have reason to believe that under his management there is a bright and prosperous future before the Company. In these circumstances, the Directors cannot think that the shareholders will have so little regard to the protection of their own property as to over-rule the Directors, who are thoroughly acquainted with the circumstances, and who have decided in the interests of the Company that the course which they adopted was absolutely necessary. They therefore appeal to you for your vote, as a vote of confidence in them."

Father LYNE said that the Directors had asked for a vote of confidence. If all the shareholders knew the real state of affairs, they would have got few votes or none. The majority of the shareholders were unaware of the fact that the Directors had taken their fees illegally for the past two years, amounting to £300. The Directors failed in an attempt to increase their fees from £150 to £250 four years ago. They tried to force the hand of the late Mr. Lyne, in trying to work their point in an illegal manner, by putting it into the Directors' report on the balance-sheet. Mr. Lyne opposed this, and rightly contended that such proposed increase should come before an extraordinary general meeting of the shareholders as a special resolution. An extraordinary meeting was called; and the shareholders opposed the motion. Since then, the Directors had shown great hostility. The hostility of the Directors was evident in the determined manner in which they refused to re-instate Mr. Alfred Lyne, though he was on the spot, and the works were sadly in need of an Engineer and proper Manager. Serious complaints about the gas had been coming in on all sides since Mr. Lyne's dismissal two months ago. It was an overstretch of authority on the part of the Directors to dismiss Mr. Alfred Lyne, for the reason only that he had shown zeal on behalf of the shareholders. The last few years were years of great strain and anxiety to both the late Mr. Lyne and his Assistant, Mr. Alfred Lyne. As to the filling of the vacant post, it was not likely that any member of the Institution of Gas Engineers, of which Mr. Alfred Lyne was a member, would accept the position, knowing all the circumstances. He then read several letters. In the first, Mr. Lyne said he could not see his way to continue to hold the position of Engineer, General Manager, and Secretary of the Company on the terms conceded by the Board for the settlement of the strike; these terms not having been laid before a special meeting of the shareholders. He therefore tendered his resignation; and it was duly accepted. Later, however, Mr. Lyne wrote: "Having regard to all the circumstances of my connection with the Gas Company, and my father's before me, and having a record of twenty years' experience in the works, and after careful consideration of all the various circumstances of the recent strike, I desire, with your permission, to withdraw the resignation I tendered to you, and to ask you to reconsider same. In the first place, your acceptance of the men's terms came on me after two days' strenuous exertion and anxiety on behalf of the Gas Company; and on the first night I may say, without fear of contradiction from any gas expert, that I saved the Company's property from disaster. Secondly, I was keenly aware of the daily increasing cost of working expenses, owing to the ever-advancing prices of materials and recent increase of wages. The introduction, therefore, of shorter hours and the three-shift system, with the heavy additional burden of expenses involved, seemed too great a responsibility for me to undertake. Now that the war is over, more favourable prospects can be looked for. If you see your way to re-instate me in my former position, I will do my best to give every satisfaction. I undertake to carry out any directions given to me by you without question." The Directors replied that if Mr. Lyne came back it would be as Engineer and Manager only; the secretaryship would be a separate appointment, when the sanction of the shareholders had been obtained at a special meeting. Until this meeting, he could hold his old positions. Mr. Lyne said he was willing to assent to this arrangement for the time being; but as to whether, if the meeting should decide to separate the positions, he would accept the post of Engineer and Manager only, he would need a little more time to consider. The next letter to Mr. Lyne announced the appointment of Mr. P. J. M'Evoy.

The CHAIRMAN having called for a resolution to be put before the meeting,

Mr. LYNE said: I propose that all the Directors be removed from office.

Miss A. LYNE, who seconded, spoke of the long, faithful, and efficient service that her late father had given to the Company as Manager.

The CHAIRMAN: There is no doubt about that.

Miss LYNE (continuing) remarked that her brother had also given long and faithful service at a low salary. As to her brother having refused to admit the men to the works, he could not let them in, for he did not know what injury might result. He was anxious to safeguard the property of the shareholders. The treatment accorded to her brother, as compared with what the Directors had done in the case of the new Manager, showed hostility towards the former.

The CHAIRMAN: I assure you we had not the slightest hostility; but he would not do what we told him.

Miss K. LYNE also complained of the way in which her brother had been treated.

The CHAIRMAN said they advertised the position; and he made no application.

Mr. LYNE: I went personally to each of the Directors, and asked to be re-instated, and was told that no hope could be held out to me. If that is not hostility, I do not know what is.

Mr. CUMMINS (after further discussion) remarked that Mr. Lyne thought a meeting of shareholders would be called; and as he was not aware of the settlement with the men, he refused on principle to open the works. As Manager and Secretary, he was within his rights.

Miss A. LYNE said the Directors wanted to punish her brother for doing his best for the Company. The men asked to be allowed to work longer hours, so as to earn more wages; and because he consented, he was accused of making slaves of them.

After an examination of the proxies,

The CHAIRMAN announced that the total in favour of Mr. Lyne's proposition for the removal of the Directors was 289, and against 572. There were 112 who did not vote. He said that even a small majority could not carry it, as such a proposition should have the support of three-fourths of the shareholders before it became operative. As matters stood, the proposition was beaten by practically two to one.

The Leeds Corporation Gas Committee are seeking sanction to the borrowing of £15,000 for extension of mains.

EAST PEMBROKESHIRE GAS COMPANY.

Meeting of Creditors.

The first meeting of creditors interested under the compulsory winding-up of the East Pembrokeshire Gas Light and Coke Company, Ltd., of No. 14, Victoria Street, S.W., was held at the Board of Trade Offices, Carey Street, last Thursday—Mr. H. E. BURGESS (Official Receiver) presiding. The summary of accounts shows unsecured indebtedness amounting to £670; loans on debenture bonds, £563; assets valued at £2829; and a deficiency of £8297 as regards shareholders.

The Company was formed in January, 1914, with a nominal capital of £20,000, divided into 2000 preference shares and 2000 ordinary shares of £5 each. The capital paid-up or credited as paid-up was £9850. The object of the Company was to manufacture, sell, and supply gas to the market town of Narberth (Pembrokeshire) and the adjacent districts; also to carry on business as a gas and water works company in all its branches. The failure is attributed by Mr. Wm. Judd, a Director of the Company, to the unexpected outlay necessitated by having to replace old and leaking mains; to increase in the cost of materials and plant, the whole of which the Company thought it unwise to put upon the consumers; and to inability to raise further subscriptions with which to carry out all the extensions proposed.

The CHAIRMAN, in his remarks, reported that the Company was promoted by a concern styled the United Gas-Works Development Company, which, in spite of its important title, was merely a small promoting Syndicate housed by Mr. Judd. They had evidently been looking round for, and fitting up, small gas-works, and promoting companies to finance them. In this case they secured small gas-works at Narberth for £1250, and sold the property to this Company for £1500, thus showing a profit of only £250. But they were out to make more profit than this. They undertook to provide the preliminary expenses, and were to receive another £1500 in this respect. They were also to be entrusted with the laying of certain additional mains, in order to make the Company a rather larger concern, and supply that part of Narberth which then had no gas; and they were to expend some £3000 upon this work. The creditors and shareholders would want to know why the Development Syndicate were to lay out the money. All this was disclosed in the circular upon the strength of which people subscribed for shares; but it seemed to him that if the Company were going to have sufficient money to make the concern larger, they need not have entrusted their money to an unknown Syndicate. This course afforded the Development Syndicate an opportunity to make a considerable profit on the price they were already obtaining for the property. In addition, the Development Syndicate were to have a certain sum by way of commission for underwriting the shares of the Company. It was not a strong Syndicate; and he did not suppose they could have taken up the shares had they been called upon to do so. The whole of these transactions would have to be inquired into; and possibly he would find some irregularities in them. The prospectus gave a very hopeful prophecy of the future of the Company. The Engineer reported that if they extended the mains, they would sell an additional 24 million c.ft. of gas, and could make a profit of £3000. Needless to say, this prophecy had never been fulfilled. A sum of £8283 was subscribed for shares; and out of this money £6875 was handed over to the Development Syndicate, leaving just over £1000 in hand with which to carry on the business. The balance-sheet showed that, in addition to the £1500 paid to the Development Syndicate for preliminary expenses, the Company spent a further £1900 themselves in that behalf. But of this £1900 some £1500 represented shares; so that about £2000 in cash was paid for the preliminary expenses of floating a small concern that cost £1250. Soon after the Company took possession of the property, they found all the gas-mains were in a rotten condition, with the result that they had to be taken up and replaced; and, in this way, the Company spent what little money they made on the sale of the gas. From the outset the Company had been short of money. They borrowed £500 from another concern which was also run from Mr. Judd's office, and by the same directorate. This loan was advanced in July, 1915, upon a mortgage on the property by way of a debenture; and in March, 1917, the debenture holders entered into possession, appointing Mr. Judd as their Receiver. This gentleman had been carrying on the business since March, 1917, at a considerable loss; so that whatever margin of profit or security might have existed at the time he took possession, had been wasted in carrying on a losing trade. Mr. Judd would be called upon to explain why he held on to the property for 21 months, when it was making a continuous loss. Eventually he (the Official Receiver) brought pressure to bear; and Mr. Judd sold it for £1250—the price originally paid for it, though in the meantime a considerable sum had been spent in relaying the mains and making them sound. He did not suppose he would see much of this £1250 in the liquidation, as he understood there might be only £100 to come from it. The prospect, therefore, was very poor for the creditors; and it was not possible that there could be any return for the shareholders. If either body felt dissatisfied, they should communicate with him. There was a great deal to be investigated in relation to the promoting of the Company and the disposal of the money. Unfortunately, Mr. Judd was in Wales at the present time; and the other Director, Sir Geo. Kekewich, was at Brighton, and had asked to be excused from attendance at that day's meeting. However, both these gentlemen would have to attend and undergo a very searching inquiry into the promotion and affairs generally of the Company.

As there was not a quorum of creditors in attendance, the meeting was formally adjourned; but the shareholders decided to leave the liquidation in the hands of the Official Receiver.

Gas Workers' Wages at Heywood.—A motion has been adopted at a meeting of the Gas Committee of the Heywood Town Council granting employees at the gas-works an increase of wages of 4s. a week.

RESEARCH WORK AT MANCHESTER.

In connection with the British Scientific Products Exhibition at Manchester, which closed on Thursday last, a report has been issued by the Governing Body of the Manchester College of Technology outlining the nature of the research work that has been carried out there recently.

In the Chemistry Department, research on fuels, under the direction of Capt. Sinnatt, has included investigations on the following problems: Heating by gas, the stripping of coal gas, and the distillation of cannel and other coals. Exhaustive examinations have also been carried out on certain products obtained from coal mines, and also upon a series of seams of Lancashire coal. In the Physics Department, Prof. Gee has published papers relating to air pollution, and has made new experiments with gas flames. He has added to the literature of the work of John Dalton. In conjunction with Mr. A. Adamson, investigations bearing on the economic use of electricity for heating purposes are in progress. Much of the work of the Air Pollution Advisory Board of the Manchester City Council has been carried out in the College of Technology, and more recently the attention of the Board has been directed to problems connected with domestic heating appliances. A room has been fitted up as a domestic heating laboratory, and investigations on the efficiency of coal, coke, and gas fires are being made under the direction of Mrs. R. B. Fishenden, M.Sc., assisted by Miss G. F. Cocks. In carrying out this work, the funds furnished by the Manchester City Council have been supplemented by a grant from the Department of Industrial and Scientific Research. The researches in this laboratory are of great importance in connection with the economical use of fuel. A preliminary report was issued in 1917; and it is hoped shortly to publish the results of later work.

The greater part, however, of the research conducted at the College was directly concerned with the war. In the Chemistry Department, researches on trinitrobenzene were carried out for the Department of Explosives Supply; and the results were communicated by that Department to the American Government.

FAILURE OF THE TEIGNMOUTH GAS SUPPLY.

Shortness of Labour and Bad Coal.

A discussion took place at the meeting of the Teignmouth Urban District Council last Tuesday on the recent failure of the gas supply.

Mr. A. J. Pratt, the Chairman of the Gas Committee, said the unsatisfactory state of the supply was chiefly due to the shortage of labour. The late Manager, Mr. Grey, warned the Committee that he was afraid he should be unable to ensure a constant supply, and an endeavour was made to get temporary stokers to tide-over the difficulty. They also asked the newly-appointed Manager, Mr. Higham, to take up his duties at once. When he arrived, the gasholder was practically empty, and the staff was so reduced that at times they had only two stokers available, and the men had to work continuously for 16 and 22 hours to keep things going. The total failure of the supply on Nov. 27 was due to the flues of the boilers being choked, so that the fires had to be drawn and the flues cleaned before steam could be raised to work the plant. The manufacture of gas had been much smaller than would have been the case if good gas coal could have been obtained; and this added to the difficulty which was caused by the shortness of labour. Mr. Higham entered upon his duties at a most difficult time; and no reflection could be cast upon him or his staff. A considerable sum would have to be spent on the works in order to bring them up to date and ensure a constant and efficient supply.

Mr. Higham, in answer to questions, said there were only three stokers now at work; and this accounted for the gas going out on the previous night. Men had left the gas-works because they could obtain better wages elsewhere. He had visited Exeter with the object of securing the return of some of the former employees at the gas-works who were now in the army; and he hoped that these men would come back. It would not relieve the immediate difficulty to instal mechanical stokers, because the alterations would take too long. The quality of the coal was still bad, but was no worse than other towns had. The supply was now a little better than it had been. Neighbouring towns had maintained their supply under similar adverse conditions because they had water-gas plant. If he had the labour, he could keep up the supply. At present, it was maintained in the most expensive and uncertain way. The situation of the works was not favourable from the labour point of view, as all coal had to be handled several times. With alterations, he could make better use of the labour. The Gas Committee had considered the advisability of restricting the supply during the day, but were unable to select a time which would not inconvenience consumers.

It was decided that the Manager should report on the condition of the works generally, with suggestions as to the repairs, alterations, additions, and improvements required.

Coke-Oven Workers and an Eight-Hour Day.—Arrangements are being made for a joint conference at the Ministry of Labour between employers and men engaged in the coke-oven industry, in connection with a demand for an eight-hour day. A week ago, there was a stoppage of work on the part of members of the National Union of Cokemen and Bye-Product Workers regarding the claim put forward by the Union to the coke-oven proprietors for an eight-hour day (inclusive of half-an-hour for meal time) for men employed at washers and crushers, bye-product ovens, bye-product plants, and bee-hive ovens. At the request of the Union, Sir David Shackleton saw representatives of the Executive, who intimated that they were prepared to advise their members to resume work forthwith, on the understanding that no men would be victimized by participation in the dispute, and that Sir David Shackleton would use his good offices to arrange a joint conference to discuss the matter.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 13.

Conditions in the tar products market appear to be settling down once more, and demand is reviving. Pitch maintains its firm tone; there being plenty of inquiry for this article. The price is steady at over 65s. net per ton in bulk at makers' works. Business is reported in solvent naphtha; the present value being 3s. 3d. to 3s. 4½d. per gallon net naked. Benzol is in good demand for motor purposes at about 2s. 3d. per gallon net in bulk for commercial uses. Tar oils are also in request at advancing prices.

In sulphate of ammonia there is no change to record; quantities being regularly taken up on the Government terms.

Tar Products in the Provinces.

Jan. 13.

The average values for gas-works products during the week were: Gas-works coal tar, 31s. to 36s. Pitch, East Coast, 44s. to 45s. per ton; West Coast—Manchester 37s. 6d. to 40s., Liverpool 37s. 6d. to 40s., Clyde 37s. 6d. to 40s. nominal. Benzol 90 p.c., North, 1s. 10d. to 1s. 11d.; 50-90 p.c., naked, North, 1s. 7d. to 1s. 8d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. 10d. to 2s. 11d. Heavy naphtha, North, 2s. 11d. to 3s. Creosote, in bulk, North, 4¼d. to 4½d. Heavy oils, in bulk, North, 5d. Naphthalene, £25 to £30; salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.c.; "B," 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Nothing of importance has taken place during the past week; but business is well maintained. The continued shortage of coal, of course, keeps down the output of all products, and any increase in consumption tells on the market all the more readily. Restrictive measures applied during the war are being gradually removed; and the outlook for the year just commenced is decidedly encouraging. Pitch is passing through an interesting phase. The foreign demand is strong, and the shipping position steadily improving; but South Wales briquette manufacturers are exerting their influence to depress prices. Makers of pitch are very confident as to the course of prices, and are fully convinced that a higher range will be brought about soon. In this connection, it is worth bearing in mind that the actual buying value of currency has been greatly reduced by the war; and pitch at 60s. now is really no dearer than pitch at 30s. before the war. Production costs show no signs of declining, and Provincial makers have been endeavouring to bring about a uniform rate of from 50s. to 52s. 6d. per ton. Such a level, however, did not appeal to the South Wales clique. The announcement that a sum of £10,000,000 is to be spent on roads will no doubt increase the belief in higher prices for pitch. The renewal of old roads, and the construction of new ones for motor traffic, is a work which requires immediate attention; and now that the National Exchequer is to bear the greater part of the expense, local authorities may be expected to hurry things along. This should lead to a better competition for pitch. The result will be that the market will not be so dependent upon South Wales or the export trade, and some improvement should follow in Provincial centres. There is a good demand for creosote; but the position in carbolic acid—particularly crystals—is rather uncertain. Crude naphthalene remains firm at from £7 to £15 per ton, and refined is steady at about £30. There is no change in solvent naphtha, which is simply awaiting a lead from the rubber goods trades. This should come along at any time now, for private motor cars and heavy motor wagons will soon be moving about more freely; and their consumption of rubber is enormous. There has been a substantial trade in benzol lately; and the agreement reached—whereby the private consumer is to pay 3s. per gallon in small tins and 2s. 11d. in drums—is being strictly adhered to by makers. Of course, packages are returnable. The main difficulty in the way of developing the trade is the extreme shortage of tins and drums; but an improvement in this respect is simply a matter of time. Meanwhile, the motor transport trade is clearly willing to take benzol where it can be obtained, and all round the outlook for the trade, which has remained dormant throughout the war, is much more promising than a few weeks ago. The trade is bringing itself into line with the readjustment of values, and pure qualities for intermediate products for dyewares will doubtless form one of the chief objectives. The agreed-on price for motor benzol compares favourably with petrol; and there seems no reason why it should not be gradually raised to the same level. Its superior thermal value clearly should count for something. Exports continue on the usual scale; but prices are much below present home value. Other products are unchanged.

The range of quotations is as follows:

Benzol: 90% London, 2s. per gallon; 50-90%, 2s. per gallon.

Carbolic Acid: 60% East and West Coast 3s. per gallon; crystals 40% 1s. 4d. per lb.

Crude Tar: London 39s. to 41s.; Midlands 33s. to 35s.; North 32s. to 34s. per ton *ex* works.

Pitch: London 65s. per ton f.o.b. works; East Coast, 38s. to 42s.; West Coast, 41s. 6d. to 43s. f.a.s.; Manchester, 41s. to 42s.; Clyde, 41s.; South Wales, 45s. to 46s. per ton.

Solvent Naphtha: London 3s. 9d. to 4s.; North and Midlands 3s. 3d. to 3s. 6d. per gallon.

Crude Naphtha: Naked 1s. 1d. per gallon.

Heavy Naphtha: London 3s. to 3s. 6d.; Provincial 3s. 3d.

Naphthalene: Refined £28 per ton nominal; salts 80s., bags included.

Toluol: Naked, 3s. 4½d. per gallon nominal.

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Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4⅛d. per gallon); heavy oil, 4¼d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1⅞d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included, *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

Home requirements continue to absorb the bulk of the output; but there are some hopes that after Spring requirements are delivered a readjustment may be possible. The export position is said to be more promising in view of the gradual cessation of the demand for ammonia for munitions, which should set free a certain amount of sulphate. It is now generally anticipated that control will be removed as soon as Spring requirements have been met; but it is, of course, possible that some relaxation will be permitted before this. Upon the steps to be taken in this connection will largely depend the future of our over-seas trade in this product.

Percentage Increase in Costs.—In advancing reasons why it had become necessary to increase the price of gas to 4s. 8d. per 1000 c.ft., Mr. Barlow (the Chairman of the Gas Committee) told the Gainsborough Urban District Council that the price of coal had increased since 1914 by 75 p.ct.; lime had increased 105 p.ct.; carting coal, 85 p.ct.; carting lime, 145 p.ct.; retorts and bricks, 77½ to 85 p.ct.; and in addition there had been the heavy increases of wages.

New Brunswick Gas and Oilfields, Ltd.—The report of the Directors for the year ended July 31 states that the gross revenue from all sources amounted to £24,745; and the net profit, after carrying £5000 to the depreciation fund, was £13,841. The sum of £15,600 was brought forward—making £29,442. The Directors recommend a dividend of 4 p.ct., less income-tax, on the preference shares, and to carry forward, subject to provision for development expenditure, £25,922. Five entirely new wells have been sunk; but unfortunately none has proved productive of oil or gas. Seven of the existing wells were deepened to the known position of the lower sands, and an additional 4,000,000 c.ft. daily of gas was thus brought in. But this is barely one-half of the minimum quantity aimed at as necessary to meet the winter requirements of gas for domestic purposes. The heavy drain on the field by the continued use of gas for burning under boilers is manifesting itself in the greater difficulty now experienced in bringing in additional supplies; and it is evident that, owing to this wasteful use of gas, the domestic consumers may in the near future suffer hardship. The report of the distributing Company—the Moncton Tramways Electricity and Gas Company—for the year to Dec. 31, 1917, shows a profit, after meeting interest on bonds and other indebtedness, of £21,691, as compared with £16,320 for the previous year.

Rationing Committee Disbanded.

With the general release from Government control of raw materials used in industry, the necessity for rationing disappears; and the Civil Industries Committee through whom the rationing has been exercised is now to be disbanded. The Committee were appointed by Dr. Addison, then Minister of Munitions, in February, 1917, under the name of the Priority Advisory Committee. Their duties were to investigate the claims of industries threatened with hardship or extinction owing to the shortage of raw materials, and to make arrangements whereby they might at least be kept alive—even if not maintained at their former level. The Committee comprised some Departmental officials, but was composed mainly of business men of such standing as to give to the traders of the country a feeling of confidence that their interests would be safeguarded. The Chairman was Mr. John Wormald, of Messrs. Mather and Platt, Ltd.; and among the members were Mr. Kenneth M. Chance, of British Cyanides, Ltd., and Mr. Henry Woodall, who is a Director of the Gas Light and Coke Company. The Committee have met for almost two years twice a week regularly, and in the earlier months three times a week; and for their valuable services they have been warmly thanked, not only by the Government, but also by the traders whom they rationed.

Lewes Gas Company Raise their Price.—Owing to the recent increase in the wages paid to the Company's workmen, and further rises in the cost of coal and other materials, the Directors of the Lewes Gas Company have raised the price of gas 6d. per 1000 c.ft. as from Christmas. Meter-rents and the charges for hire of cookers, fires, &c., will also be increased. In the case of slot-meters, the supply of gas will in future be at the rate of 13 c.ft. a penny. Where the meters cannot be changed to meet the alteration, a demand will be made for the extra charge and collected monthly.

A Consultative Board for Bradford.—Both the Bradford City Council and a meeting of the workpeople have approved in principle a draft scheme for the establishment of a Standing Joint Consultative Board, "to secure the largest possible measure of joint action between the Corporation and its employees for the development of the various services of the Corporation and for the improvement of the conditions of all engaged therein." The Board is to consist of 32 members, appointed as to one-half by the respective sections or groups of Corporation employees (the teachers, clerks, tramway-car workers, gas workers, labourers, &c., each form separate groups), in proportion to their numbers, and as to the other half by the Corporation. The members are to retire annually, but to be eligible for re-appointment. Provision is made in the scheme for the appointment of two Chairmen and two Secretaries, to be elected by the two sides of the Board; for meetings to be held as often as necessary; and for the administrative expenses to be shared by the Corporation and the employees. The Board is to be the "Works Committee" under any National Industrial Council covering any service of the Corporation.

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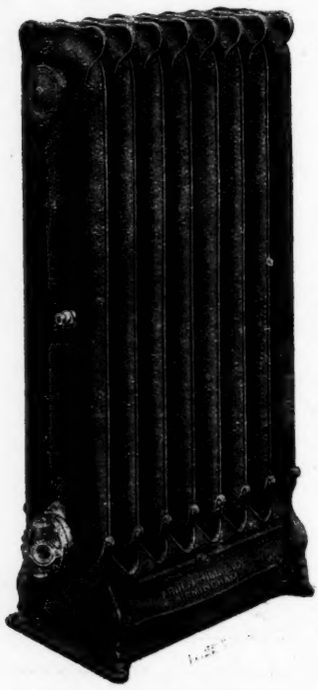

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Transport and Handling of Fuel.

In connection with the coal economy campaign, a lecture, illustrated by lantern slides, was delivered before the Association of Engineers-in-Charge, at St. Bride's Institute, E.C., last Wednesday, by Mr. J. H. Anderson, on the "Transport and Handling of Fuel." By means of the views thrown on the screen, and the explanations given by the lecturer, those present were made acquainted with the coal-loading methods in vogue on the Tyne, at Cardiff, Barry, Hull, Grimsby, and other places. Then there were photographs of colliers at sea; and afterwards there were depicted the various modern methods of discharging, including that employed at the Rotherhithe Wharf of the South Metropolitan Gas Company. Most of the plants of any consequence erected on the Thames for the purpose of discharging were shown, and, in addition to these a large number of Continental and American installations of coal-handling plant in connection with transport. One section of the slides related to fires in coal-stacks, and means of salvage, together with arrangements adopted for the prevention of spontaneous combustion.

Birmingham and Gas Rationing.

Referring to the success of gas rationing in the city, the "Birmingham Post" says the complete details of the department have not yet been prepared; but those available show how careful the department and the citizens have been. The financial year ends on March 31; and therefore the period in which the rationing has been in operation forms only part of 1918. From April 1 until the end of December, the output of the department was 8495¾ million c.ft., as compared with 8935½ millions in the corresponding period of 1917—a reduction of 439¾ millions, due primarily to rationing. When the munition works were proceeding at high pressure, right up to the armistice, the output during the week ended Nov. 9 was 249 million c.ft., as compared with 283 millions in the corresponding week of 1917. Since the early days of November, when the munition works began to reduce their activities, the consumption of gas has lessened in a greater degree. This is evident from the output during the last week of the year, which was only 165¾ million c.ft., a decrease of 54¼ millions as compared with the corresponding week of 1918, when there was no rationing, and all the works were in full activity. The greatest consumption in any one week in the latter part of 1918 was 268¼ millions; but the greatest for any week during the year was in the week ended Jan. 11, when the output was 334 millions. The ration scheme has been the salvation of the Gas Department, whose stocks of fuel have all through 1918 been unusually short.

The Birmingham Public Free Libraries Committee are establishing an Industrial and Commercial Library. Adequate attention is devoted to the gas industry and to kindred work.

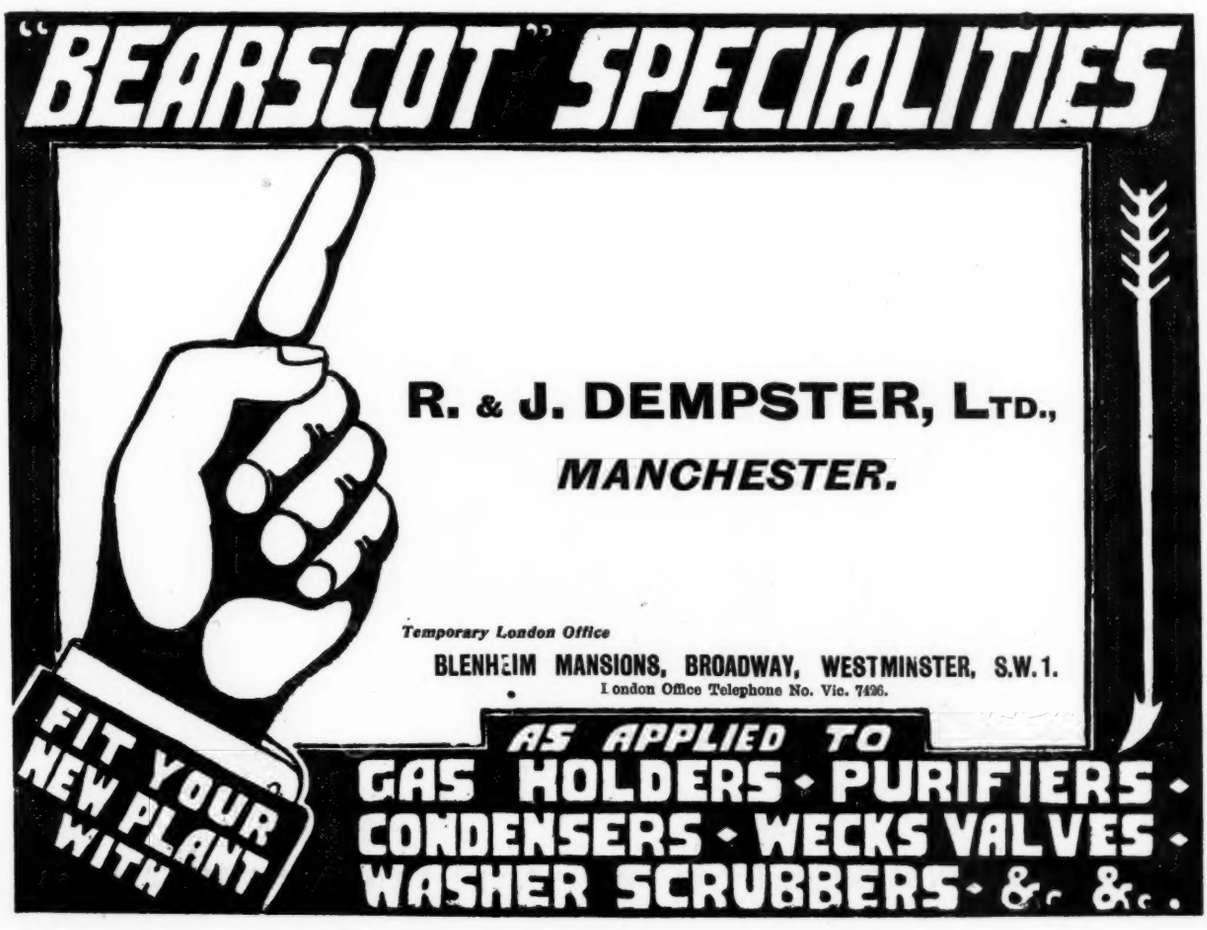
Birmingham Gas Reserve Fund.—The Birmingham Corporation report that, with respect to the suggestion that provision should be made in their Bill for an increase of the gas reserve fund, it is not now proposed to insert any clause to this effect, as it has been decided to defer the obtaining of further powers in this direction.

Irish Lighting Restrictions.—The concession of an additional 25 p.ct. in gas and electricity does not apply to Ireland, because, as the Irish Coal Controller has explained, while economy in England was effected by rationing, in Ireland it depends on voluntary agreements between commercial institutions and local authorities; and these agreements remain in force until the end of the war.

Materials for High Explosives from Manchester.—Figures have been submitted to the Manchester Corporation Gas Committee showing the department's war contribution in the form of high explosive materials for the Ministry of Munitions. Between January, 1916, and November, 1918, there were produced 803,799 gallons of benzol, 267,933 gallons of toluol, and 87,311 gallons of solvent naphtha. In the period April, 1916, to November, 1918, 5600 tons of acid were converted to pure acid, and 9600 tons of ammoniacal liquor were converted into concentrated ammonia.

Gas-Works and Demobilization.—Addressing the members of the Warrington Town Council, the Mayor (Sir Peter Peacock) explained that labour difficulties were largely responsible for the poorness of the supply of gas. Some fifty men were taken into the army from the gas department; and since the cessation of hostilities, the Gas Manager (Mr. W. S. Haddock) had pressed for the demobilization of these men. Up to the present, however, only one lamplighter had been released. The method of dealing with the demobilization of men who in civil life were engaged in public services, was idiotic; and he hoped members of Parliament would cause pressure to bear upon the Government in order to bring about a better state of affairs. Not only were the Corporation blamed for bad municipal service, but they were paying a proportion of the wages of employees who were in the forces; and the men themselves were grumbling, because they were kept on jobs which were of comparatively little use to the country.

Belper Council and the Public Lamps.—Difficulty has arisen in connection with the resumption of public lighting at Belper. According to a statement regarding the position issued by the Chairman of the Lighting Committee (Mr. T. Smith), as soon as the armistice was signed he communicated with the Derby Gas Company, who gave them notice that they could not maintain the lamps as before. The war had been proceeding considerably over two years before the town was plunged in darkness. Being under the impression that the war would not last long, the Council did not think it worth while to take in the lamp-heads; and it was now found that enormous damage had been done. This could not be helped. The Committee made a mistake, and must abide by it. He had come to the conclusion that the Council could light the town automatically, and in the end save a considerable sum of money; and negotiations were now in progress with the Gas Company to supply the clockwork for the purpose.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Electricity Breakdown.—Owing to a partial breakdown of the Dublin Corporation electricity installation one day last week, the electric lighting in the central (Sackville Street) area of the city failed, and business was considerably interfered with. Picture houses had to close-down for a time.

Manchester Undertakings' Contributions to the Rates.—The Manchester Corporation gas, electricity, markets, and tramways undertakings, according to the abstract of the city accounts for the year ended March 31 last, contributed collectively £144,756 to the rates, compared with £184,124 in the year 1916-17. The Electricity Department contributed £16,570, against £30,000; and the Gas Department £25,000 compared with £50,000 in the previous year.

Death in a Bathroom.—At Hammersmith, a girl aged seventeen was found dead on the floor of the bathroom, with the geyser still on and the water running. Evidence forthcoming at the inquest showed that there was no ventilator in the room, and that the girl had been overcome by the fumes from the geyser. A doctor said death was due to syncope and suffocation from carbon monoxide poisoning. The Coroner pointed out the necessity of all bathrooms with geysers being fitted with a proper ventilator to take off the fumes. There was a verdict of "Death from misadventure."

Effects of Restrictions at Leeds.—The prospect of an increased gas ration has raised high hopes in Leeds, where the restrictions have had very serious consequences. The reduction of consumption has amounted to 20 p.ct., or between 1½ and 2 million c.ft. less daily in household use—a reduction in revenue of between £2000 and £3000 per week, with no reduction in standing expenses. Despite complaints, now and again, of poor quality gas, the tests show that the Leeds gas is better than it need be. Though the standard for wartime was fixed at 450 B.Th.U., it has been found that in Leeds the standard in August was 525 B.Th.U., in September 519 B.Th.U., in October 514 B.Th.U., and in November 507 B.Th.U.—the slight fall being due, of course, to coal difficulties.

Gas Complaints at Hackney.—The Works Committee of the Hackney Borough Council report that, as the necessity for further manufacture of war explosives has apparently come to an end, there does not seem any reason why the Gas Light and Coke Company should not now be required to comply with the statutory provisions governing the quality, &c., of the gas supplied to the public by them. The Committee therefore recommend that communications be addressed to the Board of Trade and the London County Council calling their attention to the inconvenience and the extra expense to which residents and business people in the borough are put by reason of the continued inferior illuminating and calorific power, purity, pressure, &c., of the gas supplied by the Company, notwithstanding the greatly increased charges, and that the Board of Trade and the County Council be asked to take early action for securing that the prescribed standards shall be complied with by the Company.

Capital Requirements at Leeds.—In reply to the Local Government Board's inquiries for information from authorities as to contemplated expenditure following the war, the Leeds Gas Department suggest additional capital expenditure—notably for reconstructing the water-gas plant. There are other possibilities on the completion of negotiations for the purchase of gas obtained from coke-ovens. Originally Leeds announced works in various departments to cost about £2,000,000, about half of which would require to be spent during the year immediately after the war; but the increased cost of labour and materials renders the estimates not large enough.

The Recent Nelson Strike.—In moving the adoption of the Gas Committee's minutes at the monthly meeting of the Nelson Town Council, Alderman Fell said they were extremely sorry the town had been plunged into darkness; but it was through no fault of theirs. Neither the Committee nor the Council had any quarrel with the men's Union. In fact, Mr. J. T. Watkins (one of the officials of the Union) had said their relations with the Nelson Corporation had always been very cordial; and he regretted that it had been found necessary to put the Corporation to any trouble. They were, however, dragged into the dispute, and had to get out of it the best way they could. He could assure the public that, so far as the Committee were concerned, they left no stone unturned in their efforts to get the matter settled. It will be remembered that it was a sympathetic strike of the Nelson gas workers to aid street sweepers in the adjoining township of Brierfield, which Nelson supplied with gas. The strike lasted a week, and caused great inconvenience.

Knaresborough Gas Situation.—Expert advice, as directed by a recent meeting of the District Council, has been taken in regard to the Knaresborough Gas-Works; and the report of Mr. Frank H. Robinson, of Harrogate, was submitted to the Council on Wednesday last. It may be remembered that there has been serious leakage and loss. The report condemns the works and methods of working, and estimates an outlay of £9000 to put the undertaking in proper order. After a suggestion that the Council should purchase gas in bulk from Harrogate had been considered and rejected, Mr. Hewson said they had been told plainly that the unsatisfactory position was due to bad management, or, as the report put it, "lack of technical supervision." He moved the appointment of an expert manager; adding, on the suggestion of the Chairman, that this official should have a knowledge of electricity. On this motion being seconded, quite an interesting conversation ensued. "But we have a Gas Manager," said a member. "What about him?" The Chairman: Who is he? The Member: The Clerk. The Clerk: No, I am only Collector. Another Member: What about the foreman at the works? The Chairman remarked that this was the first time he had heard the positions defined. The proposition was agreed to; and the matter of carrying into effect repairs and improvements recommended in the report was deferred to a special meeting to be held at the works.

SAWER & PURVES,

THE POSITIVE DRY PREPAYMENT METER

MANCHESTER & NOTTINGHAM.

Fatality at a Birmingham Gas-Works.—William Brewerton (38) met with a fatal accident at the Nechells Gas-Works of the Birmingham Corporation on Monday of last week. He was taking a load of coke up a lift, when the lift slipped, and he was thrown out.

Stafford Gas-Works Coal Stock.—The serious shortage of coal at Stafford, and the fact that the people are not getting their rations, has brought into prominence the question of utilizing the surplus stocks at the gas-works for the benefit of the inhabitants. There is an impression among a section of the Council that the time is now opportune for the coal to be disposed of in this way. While the Gas Committee are prepared to give careful consideration to the matter, it is argued against the suggested utilization of the coal stocks at the present juncture, that the worst part of the winter has not yet arrived; and, further, the coal merchants have given an assurance that they will do their best to cope with the shortage, by giving the poorer classes a preference in supply. The Coal Control Committee are dealing with the matter on these lines. At the same time, the Gas Committee are appealing to the public to economize rigidly in coal, and to use coke wherever possible. The public are assured that there are ample supplies of coal at the gas-works, for use if the position becomes any worse, and such a course is rendered absolutely necessary.

Haywards Heath Gas Company and the Sewers.—The Sub-Committee appointed to inquire into the question of the Gas Company's waste liquids being admitted to the sewers submitted their report at the last Council meeting. It had been resolved by them that the Council be recommended to inform the Company that the Council are not prepared to agree to any proposal at the present time with regard to filters, but that the matter can be gone into again if, and when, such works are carried out—it being clearly understood that if the Company construct any filters they do so entirely on their own responsibility. The proceedings of the Committee were confirmed.

Increased Price at Barnet.—The "Star" says that the announcement that the gas companies in South London have no immediate intention of following the example of the South Suburban Gas Company, who have reduced their scale to the extent of 3d. per 1000 c.ft., was disappointing; but the news from North London regarding the decision of the Barnet District Gas Company to advance the price 4d. per 1000 c.ft. dispels the pleasing superstition of coming cheapness. Consumers in the Barnet area have been informed that the increase will take effect immediately after the Christmas quarter; and the Directors quote advances in cost of materials and wages as the reason for the increase. This will also apply to prepayment consumers.

STOCK MARKET REPORT.

LAST week the Stock Exchange got fairly started in business for the New Year, without any holiday interruptions in sight for awhile; but it did not seem able to avail itself much of its opportunity. Business jogged along in a torpid and apathetic mood, and there was a general lack of enterprise, except in some of the industrial lines which were specially affected. This state of things was ascribed in large measure to a big demand for War Bonds; and as the issue will cease next Saturday, the rush this week may be expected to be heavy.

In the gilt-edged market, Home Government issues held firm; War Loans slightly improving their position. Indian issues again were in request. Home Rails lost some of their gains owing to uneasiness in regard to labour, but recovered partially before the close. Argentines were dull throughout.

In the Foreign Market, the brightest point was in French; both loans making steady advances. Russians had a further fall, and then steadied a bit. Japanese continued firm. Among Miscellaneous, Rubber and Oil were well supported; and there was a good demand for Breweries and Iron and Steel concerns.

Business in the Gas Market was rather languid, and by far the greater portion of it was in Gas Light and Coke and Imperial Continental; bargains in any of the rest being countable on the fingers of one hand. The general tendency was decidedly favourable; prices and quotations for the most part showing a higher level where any change at all was made. Thus Bombay, Brentford "B," Gas Light maximum, Newcastle, and South Suburban debenture were all higher. Imperial Continental lost 2, and Primitivas were fractionally easier. The position in Buenos Ayres appears to be thickening; the latest move of the Municipality being to whittle-down their indebtedness by pretended offsets.

Bargains done for cash during the week were as follows: On Monday, European 13½, Gas Light ordinary 73, ditto maximum 57⅞, ditto preference 70½, Imperial Continental 120, 120¼, 120½, Primitiva debenture 75¼, 75½, South Metropolitan 76, 76¼, 76¾, South Suburban preference 79, 80. On Tuesday, Bombay 6, 6⅛, European 13¼, Gas Light ordinary 73, 73⅛, ditto maximum 57¾, Imperial Continental 119, 119½, 120, 120½, Primitiva 40s., ditto preference 71s. 3d., South Metropolitan 76, 76¼, South Suburban debenture 86. On Wednesday, Bombay £6 0s. 6d., Brentford "A" 79, Cape Town 4, Gas Light ordinary 73, 73⅛, 73¼, ditto maximum 57, 57⅛, Imperial Continental 118, 118⅛, 119, 119½, 120, Ascot 10 p.ct. 7, ditto 7 p.ct. 6 15/16, City of Ely 85, 85⅛, Grays and Tilbury "A" 10 7/16, ditto "B" 7 7/16. On Thursday, Alliance and Dublin 52⅛, Bombay 5⅞, Commercial 3½ p.ct. 63, Gas Light ordinary 73, 73¼, 73⅜, Imperial Continental 118⅛, 119, 119¼, 119½, South Metropolitan 75½. On Friday, Alliance and Dublin 53⅛, Brentford "A" 79½, European 13¼, Gas Light ordinary 73, 73⅛, 73½, 73¾, Hastings and St. Leonards 3½ p.ct. 45½, Imperial Continental 118, 118½, 119, 119¼, 119½, ditto debenture 71½, Oriental 103, Primitiva debenture 75¼, 75½, South Metropolitan 76, South Suburban 78¼, City of Ely 85, 85⅛.

In the Money Market, rates were at first fairly constant, but later they became more easy. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When last Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,040	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,868	"	April 8	2½	4⅜	Alliance & Dublin Ord.	59—64	51—56	52½—53½
274,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	62—67	..
280,000	5	April 22	7½	8%	Bombay, Ltd.	5⅞—6⅛	5⅞—6⅛	5⅞—6⅛
50,000	10	Feb. 26	16	11%	Bourne-mouth Gas and Water { 10 p.c.	29—30	22—24	..
883,110	10	"	7	7%	B 7 p.c.	15—15¼	10½—11½	..
115,000	10	"	6	6%	Pref. 6 p.c.	13½—14	9½—10½	..
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68*	..
992,045	Stk.	Feb. 26	14	4%	Brentford A Consolid.	261—266	78—81	79—79½
784,990	"	"	11	4%	Do. B New	204—209	72—77	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	77—83	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	62—64	..
217,880	"	Feb. 26	11	8½%	Brighton & Hove Orig.	208—218	140—145	..
244,200	"	"	8	5½%	Do. A Ord. Stk.	154—159	97—102	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	22/6	British	44—45	31½—32½	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66*	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—63*	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	3/—4½	4
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7½—8½	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65*	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,518,280	"	Feb. 12	5/9/4	86/-	Commercial 4 p.c. Stk.	106—108	62—67	..
560,000	"	"	5½	80/-	Do. 3½ p.c. do.	103—105	58—63	63
475,000	"	June 11	8	9%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	50—55	..
900,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	..
51,600	Stk.	Aug. 29	14½	13½%	Croydon A 10 p.c.	..	160—170	..
278,400	—	"	11½	10½%	Croydon B and C 7 p.c.	..	135—140	..
492,270	Stk.	—	6	5½%	Derby Con. Stk.	128—135	95—100	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,022,180	10	July 29	10	5/0	European, Ltd.	17½—18	13—14	13½—13⅝
16,298,975	Stk.	Feb. 10	4/17/4	29/4	Gas Light and Coke { 4 p.c. Ord.	98—102	72—74	73—73½
2,600,000	"	"	3¼	3½%	3½ p.c. max.	76—79	56—58	57—57½
4,062,235	"	"	4	4%	4 p.c. Con. Pref.	96—99	69—71	70½
4,074,850	"	June 11	3	3%	3 p.c. Con. Deb.	73½—74½	55—57	..
180,000	"	"	10	10%	10 p.c. Bonds	..	..	..
93,500	"	Mar. 12	5	4½%	Hastings & St. L. 5 p.c.	..	60—65	..
958,740	"	—	3½	2½%	Do. 3½ p.c	87—89	45—50	45½
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7½—8½	..
86,600	Stk.	Sept. 12	9½	9½%	Hornsey 7 p.c.	..	117—122	..
181,000	"	Mar. 12	7½	6½%	Ilford A and C.	151—154	92—97	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65*	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	118—123	118—120½
1,335,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	71—73	71½
235,242	"	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	"	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A	211—218	..	..
						146—148	82—84	..
806,068	"	June 26	4	4%	Do 4 p.c. Pr. Deb. Stk.	..	71—73	..
165,736	"	Aug. 15	4½	4½%	Maidstone 5 p.c.	..	60—65	..
75,000	5	June 11	6	8%	Malta & Mediterranean Met. of Melbourne { 4½ p.c. Deb.	4½—4⅝	3½—3¾	..
250,000	100	April 1	4½	4½%		99—101	90—97	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	9½—9⅞	..
1,875,892	Stk.	July 29	4½	3½%	Newcastle&Gateh'd Con.	95½—99½	73½—74½	..
532,705	"	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—88	57—59*	..
55,940	10	Feb. 26	7/14/0	7/10	North Middlesex 7 p.c.	14—15	9½—10½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	106—105	103
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅝	4—5	..
60,000	50	Feb. 26	13	9%	Portsea, Island B	126—131	78—88	..
100,000	50	"	12	8%	Do. C	118—121	60—65	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	2—2½	40/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	3½—3⅝	71/3
521,800	100	June 9	4	4%	Do. 4 p.c. Deb.	91—98	74—76	75½—75½
600,000	Stk.	July 31	4	4%	Do. " " 1911	..	59—67	..
846,198	"	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60*	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7½—8	..
125,000	50	July 1	5	5%	5 p.c. Deb.	44—49	40—42*	..
185,000	Stk.	Mar. 12	10	10%	Sheffield A	223—224	170—173	..
209,984	"	"	10	10%	Do. B	223—224	170—173	..
628,500	"	"	10	10%	Do. C	220—222	168—172	..
183,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	May 28	9	6/-	South African.	10½—11½	13—14	..
6,609,895	Stk.	Feb. 10	5/4/0	32/-	South Met. 4 p.c. Ord.	111—113	76—77	75½—76¾
250,000	"	July 12	—	5%	Do. Pref.	..	93—95	..
1,895,445	"	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	55—57	..
224,220	"	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	114—116	..
952,795	"	"	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	77—80	78½
60,000	"	"	5	5%	Do. 5 p.c. Pref.	110—112	75—78	79—80
185,000	"	Feb. 26	5	3½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	87—90	86
647,740	"	May 14	5	3%	Southampton Ord.	99—102	67—70	..
120,000	"	Feb. 12	7½	5½%	Tottenham District { A 5 p.c.	135—138	93—97	..
782,275	"	"	6	4%	B 3½ p.c.	115—117	67—69	..
181,255	"	June 26	4	4%	4 p.c. Deb.	87—89	61—63	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
226,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109	87—88	..
80,000	"	Feb. 26	8⅔	6⅔/9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—158	90—95	..
255,686	"	"	6⅔	4⅔/9	Do. B 3½ p.c.	129—134	70—75	..
352,000	"	"	6⅔	4⅔/6	Wimbledon 5 p.c.	117—122	70—75	..
98,000	"	"	6⅔	4⅔/9	Epsom 5 p.c.	121—126	72—77	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—52*	..

* *Ex div.*

An Isle of Wight Gas-Works Closed.—The Yarmouth (I.W.) Gas-Works have closed through the dearth and high price of coal in the island.

Difficulties at Alfreton.—When the Alfreton Urban District Council recorded a strong protest against the poor quality of the gas, it was stated that the Gas Company had had difficulties over supplies, and that the stock of coal was very short.

Attempted Damage at Nelson.—The Gas Committee reported at last Tuesday's meeting of the Nelson Town Council that, during the recent strike of gas workers, an attempt was made to render useless the coal breaking and elevating plant. At a special meeting, the Committee instructed the Town Clerk to report the occurrence to the Manchester Branch of the National Union of General Workers.

An Anti-Vibrator Device.—A report submitted to the Dublin Corporation Lighting Committee with reference to the fitting of an anti-vibrator device, showed that during the past three years the device had been applied in 1450 street lamps, with the result that there had been a considerable saving in mantles. The Committee gave Mr. Peter Cahill, foreman tinsmith in the Lighting Department, who invented the device, liberty to patent it.

Wages at Birmingham.—The Labour Committee of the Birmingham Corporation have referred to the Interim Court of Arbitration an application by the Amalgamated Society of Gas, Municipal, and General Workers for the extension to the manual employees of both the certified and non-certified departments of the Corporation of the recent advance of 5s. per week granted by the Committee on Production to the operatives in the engineering trades.

Street Lighting at Bradford.—The renewal of street lighting in Bradford is proceeding slowly towards the 50 p.ct. of pre-war lighting allowed by the Coal Controller. Normally, the city and its area has 14,000 gas-lamps, of which only 2500 were used during the war. At present about 4000 are employed; but the increase of lighting is handicapped by the limited gas supply consequent on coal and labour shortage at the works, and a lack of lamplighters. There has been much damage to street-lamps by mischievous youngsters.

A Reversion to Gas.—After discussion of failure of the electric lighting in some departments of the workhouse, the Ardee Board of Guardians decided to revert to gas lighting for a month, pending consideration of the question of securing a new plant for workhouse use only, instead of relying on the town electricity for supply. One of the members said gas used to cost the Guardians about £70 per annum; and he understood the expenditure on electricity was more than this—perhaps about £80. It was stated that on a recent occasion the electric light failed during an operation in the workhouse hospital.

The Goole Urban District Council Gas Committee have decided to increase the salary of Mr. L. W. Nuttall, their Manager, from £300 to £350 per annum.

A mass meeting of the workers of the Alliance and Dublin Consumers' Gas Company decided to make a demand for four days' pay stopped for Christmas holidays.

Messrs. Firth Blakeley, Sons, and Co., Ltd., of Thornhill, Dewsbury, have opened new and more convenient offices at No. 15 Park Row, Leeds, where all communications with reference to new plant and apparatus should in future be addressed. Having completed their munition contracts, the firm are now in a position to deal expeditiously with all requirements in connection with gas-works and coke-oven plant.

A complimentary letter by Lord Moulton, Director-General of Explosives Supplies, to Mr. Alexander Wilson, of Glasgow, is included in the minutes of the Gas Committee. He states that Mr. Wilson, in the early stages of the war, stimulated the interest of the gas-works in the extensive district which he took under his direct control, in recovering raw material for the manufacture of explosives; and during the whole course of the war, he succeeded in maintaining this interest at a high level. Lord Moulton also compliments the individual effort made by Mr. Wilson and his staff at Glasgow, and the large production for which he had been directly and indirectly responsible.

NEWSPAPERS FOR NEUTRAL COUNTRIES.

The Secretary of the War Office has issued the following order:

> The public are informed that newspapers and other printed publications will not be sent to Neutral Countries unless they are posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. Persons desiring to send newspapers, &c., to Neutral Countries should, therefore, give their orders for execution to publishers or newsagents who have obtained such permission.

The Publisher of the "JOURNAL" has obtained the required permission of the War Office; and he will, on receipt of instructions, forward copies direct from the office to any neutral country.

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